

Lectures on Practical Mining in Germany.

CLAUSTHAL MINING SCHOOL NOTES—No. LXX.*

BY J. CLARK JEFFERSON, A.R.S.M., WH. 8C.,

Certificated Mining Engineer.

(Formerly Student at the Royal Bergakademie, Clausthal.)

[The Author reserves the right of reproduction.]

SECTION V.

A stempel which has been properly fixed in position should rest with the whole surface of the ends bearing against the faces of the Buhnloch and Anfall, and have been driven in so firm and rigid that when the last blows are struck they should cause a sharp clear tone. If the blows fall with a dull sound it is a sign that a portion of the fibres of the stempel are under but a slight strain. According to many persons it is not necessary or desirable that, on being first fixed in position by the mine carpenter, the Anfall end of the stempel should fit everywhere close against the surface of the Anfall or Eintrag, but should gape slightly at the upper end, which is first closed by the weighting of the roof or hanging wall. Whether any real advantage is gained thereby may, perhaps, be doubted. In no case, however, should the lower end of the Anfall end of the stempel gape, since the weighting of the roof or hanging wall would throw an excessive strain on the upper side of the stempel, which if the axis of the stempel deviated much from the perpendicular between the two sides of the lode would, in all probability, cause the upper portion of the stempel to split off; and it is probably to avoid this splitting off of the upper side of the stempel that it is recommended, as above, that the upper side of the stempel shall gape slightly when first fixed in position, the weighting and the lowering of the roof carrying the Anfall end of the stempel with it till the end everywhere fits tight, and the strain is uniformly distributed over both ends of the stempel.

As a rule there will not be any great difference in the size of the ends of the stempel, and we have previously pointed out that in the case where the end of the stempel has to be cut to form a joint the thicker end of the stempel is placed uppermost. The most natural position appears to be in the case of stratified deposits to place the thicker end on the ground; where, however, a notch has to be cut for its insertion, as in the case of forming the Buhnloch, in the lying wall of the lode the thinner end is placed in the notch, which thus requires less dressing, and has besides the advantage that the roof or hanging wall is supported over a somewhat larger area.

In describing the fixing of a stempel, or prop, we have supposed the stempel to be inserted in the lode and the prop in the seam—in the workings. These, however, are essentially examples of simple timbering in working places; when the stempel—or cap piece, as it would be more properly called—has to be inserted against the roof of a drift the above method of preparing the Anfall and driving down the stempel is inapplicable, since in this case the stempel can only be inserted from the side or beneath. Neither of these cases, however, are analogous to the case of an ordinary stempel fixed in a lode, in which the weight of the hanging wall only tends to wedge the stempel tighter in its place. In the latter case it is rather the roof than the sides which it is intended to support; the stempel will in this case rather take the place of a beam than that of a strut. When the stempel is inserted from the side the following is the mode of proceeding, as described by Ponson. At one side of the drift, close to the roof, a notch is cut slightly larger than the end of the stempel intended for insertion, so as to allow of the necessary play for inserting the stempel. At the opposite side of the level a notch is cut, in a similar manner as in forming the Anfall in the hanging wall of a lode, only in this case the arc (to which one side of the notch must be cut, so as to allow this end of the stempel to pass into the notch) is described in a horizontal plane close to the roof of the level. Before this second end of the stempel is inserted a chock wedge is placed against the face of the notch, and the stempel then driven close up at this end till in position, when it should be at right angles to the two sides of the drift, and as a sign that it is wedged sufficiently tight the blows should fall with a sharp clear tone. In order, however, that the vertical strain shall be distributed uniformly over the whole length of the stempel or cap wooden wedges are driven between the top of the cap and the roof. When it is necessary to remove one of these stempls, and replace it by another, it may often happen that there is not sufficient room to introduce it sideways, though one end may still be passed into the Buhnloch. The end of the stempel must then be introduced from beneath. In this case it will be necessary to dress off the lower projecting ledge of the notch, and to form a flat inclined surface, against and between which and the end of the stempel a wedge can be driven. Such a wedge is usually designated in this country a lid (German, Fusspfahl, or Anpfahl). It may happen that on account of the loose or broken character of both the hanging and lying wall that it is impossible to insert either Buhnloch or Anfall, and a lid must be inserted at both ends of the stempel. In this case the lids must be of considerable dimensions, at least length, since in this case their real purpose is to offer a larger surface for taking the pressure from the sides of the lode (or roof and floor of stratified deposits) than is offered by the ends of the stempel. The Fusspfahl, which is laid on the floor or lying wall of a lode, having to serve the same purpose as the Buhnloch, is generally notched to receive the foot of the stempel. Where the Fusspfahl are of considerable length they are often made of half round wood, with the flat end placed next to the walls of the lode. To correspond with these the Anfall end of the stempel is usually hollowed out to fit the curve of the Fusspfahl, or, as it is more properly called when placed against the hanging wall, the Anpfahl. The Buhnloch end of the stempel is often hollowed out in the same manner, when the Fusspfahl receives no notch to correspond to the Buhnloch. A stempel thus hollowed at either or both ends is said to ride on the Anpfahl. This hollowing out of the ends of the stempel entails, however, two great disadvantages; first, in the case of very heavy pressure, the round portions of the Pfahl act as wedges, and cause the stempel to split in the direction of its length; and, secondly, the stempel is liable, if it deviates much from the perpendicular to the Anpfahl in the case of great pressures, to slide along the Anpfahl. To remedy the first defect it is advisable to dispense entirely with the hollowing of the ends of the stempel, and to cut the Fusspfahl and the Anpfahl to correspond as nearly as possible in imitation of the Buhnloch and Eintrag. It is, however, scarcely advisable or possible to form the notch in the Fusspfahl as a square or round hole, similar to the Buhnloch. The best way after having cut the corresponding end of the stempel square off is to give it an additional cut at the lower edge, inclined at about 60° to the axis of the stempel, the end of which then consists of two faces, one at right angles to the axis and the other on the under side inclined at about 60° to the axis (about 30° to the other larger cross face). The Fusspfahl, whether rectangular or circular in section, is cut to correspond. The object of making this second inclined cut on the lower part of the end of the stempel is to avoid the liability of splitting the lower edge of the notch off in the case of a great pressure on top of the stempel. The Anpfahl end of the stempel is cut in exactly the same manner as before described—inclined to the axis of the stempel. The Anpfahl itself is cut or hollowed out to an arc of a circle, with the middle of the notch in the Fusspfahl as centre and the length of the stempel as radius. To obviate the second disadvantage—the sliding of the Anfall end of the stempel upwards along the Anpfahl—a groove is cut in the Anpfahl just above the end of the stempel, in which a key about 3 in. long is inserted. A strong wooden peg is often used for the same purpose. Sicker proposes notching or grooving the Anpfahl, so that the stempel end may be introduced sideways into this notch or groove.

When the stempel has to be introduced into its position from below (driven upwards), and where the sides of the drift are sufficiently firm, the lid is formed slightly tapering, so as to constitute a wedge. The edges are often bevelled off, to enable it the more

readily to be driven up tight. The lid is placed in position with the thicker end downwards. After the side has been dressed to receive it, by means of the measuring lath, the length of the stempel is accurately taken. After the stempel has been cut one end is inserted in the notch at the opposite side of the drift, and the stempel then raised into a horizontal position close against the roof; the wedge is inserted tight with the hand, which will be generally sufficient to hold up the stempel till the wedge can be driven home by means of the sledge hammer. It may be necessary to insert a small piece of wood between the stempel and the roof, to prevent the latter being driven up close to the roof before the end of the stempel is entirely covered by the lid. When the lid overlaps the end of the stempel on all sides the small piece of wood between the stempel and the roof is removed, and both are driven up as tight as possible. In the case of considerable vertical pressure it may be advisable to alternate the Buhnloch on one side and then on the other.

We have hitherto spoken of the lid as intended only to secure a firm footing for one or both ends of the stempel: where, however, the sides require supporting over their whole height the lids are prolonged downwards, and notched into the floor, thus passing into the legs of a kind of door-set, and forming one example of compound timbering; the lid being then called a stringing plank.

The use of lids is, however, most usual in stratified deposits, where they are inserted between the props and the roof. They then are often cut slightly tapering, to form a wedge, which allows of a prop being driven tight up more readily than if both faces of the lid were parallel. When the roof is bad (liable to break off in short pieces, like slabs) it is necessary that the lid should cover a considerable length of the roof, and for this purpose an old sleeper is often used in the working places, though it is best to have proper sized cap-pieces where their use is frequent; such timbering bears the name "Unterzug." If supported solely in the centre with a single prop they are liable to be bent and broken, though this is the general practice, and it is much more rarely that they are supported by two props placed near the ends.

The great disadvantage in the use of lids lies in the fact that they become flattened and split under considerable pressure, which has only to overcome the lateral cohesion of the fibres of the wood; this is soon destroyed, and the round fibres become flattened, which is shown by the impress of the round end of the prop when the latter are borrowed. At the same time that the tubes collapse the lateral cohesion of the fibres is destroyed, and the lid splits. The lids will in some cases be reduced in consequence to two-thirds their thickness, which thus reduces the effective length of the prop and lid by one-third the thickness of the lid. In many coal mines this will not seriously affect the safety of the roof, which in consequence of its elasticity will bend to this amount without becoming cracked. In most metalliferous mines the hardness of the strata would not allow it to bend to such an extent, and where the object is to support a large portion of the side, which is partly loosened by cracks, the shortening of the length of the stempel by the above amount might give the partial cracks sufficient space to allow the weight to enlarge and extend the cracks so much as to completely loosen the mass, and which the props with the above effective (shortened) length would be incapable of supporting. Hence though the weighing and lowering of the roof may have no disadvantageous effects, but often the contrary in coal mines, yet the loosening and weighting of the sides in this manner in metalliferous mines may be very dangerous, and hence it is always advisable in the latter case (where possible) to fix the stempel in position without the insertion of lids between the ends of the stempel and the sides of the lode.

In the case of both metalliferous and stratified deposits it is most usual to place the stempls and props in regular rows; the use of single props, however, is much more frequent in coal mines to support isolated portions of the roof or side, which threaten to come loose and fall down. Such single props are generally called stragglers. The place and position in which they will be best fixed are carefully ascertained by examining the visible rifts or clefts in the roof or side, as the case may be, and also by knocking with the head or shaft of the pick or hammer. This latter will often be the only way in which dangerous portions of the roof can be ascertained, a sharp clear sound being generally taken as a proof that the ground is solid and no cleft exists, whilst a dull hollow sound is assumed to prove the contrary. When the loosened piece is of considerable size and thickness it will give a sharp clear sound, so that this latter cannot always be taken as a definite proof of the non-existence of a crack or cleft; in such a case only the edges near the cracks will give a hollow sound, and the extent and dimensions of the cleft must be judged from the visible or determinable portions of the crack near the face of the rock, and a local experience as to the direction in which such clefts run.

In the case of coal mines and salt mines, where the pressure is excessive or the height considerable, it is usual to replace the rows of timbering by so-called chest or box timbering. This is usually formed of timber square in section (or if round with two flat faces sawn on opposite sides) laid crosswise over each other—i.e., two blocks of wood about 6 in. square and 24 to 30 in. in length are laid on the ground parallel to each other, and about 14 to 20 in. apart, centre to centre; on these two a second pair are laid at right angles, and likewise from 14 to 20 in. apart, centre to centre. In this manner the roof of the Barnsley seam of coal is generally supported along the working faces. In the Silkestone seam of the Victoria Colliery, Stanley, similar chest timbering is placed as an additional support at intervals between the ordinary rows of props. When the pressure is considerable it is but seldom that the entire pile can be robbed without first backing one of the foot chocks in pieces. At the Monkwearmouth Collieries partly in order to avoid the loss of timber as above, and partly in order that the weight of the roof may be taken gradually, the foot chocks are laid on small coal, which thus renders the robbing of the timber much less difficult. The pillars are placed from 18 to 24 ft. apart, and in two rows, the pillars of one row being opposite the centre of the spaces between the pillars of the other row; the chocks are from 8 to 10 ft. square. Sometimes the chocks of which these pillars are built are laid close to each other, as at the Dundyvan Iron Mines, near Gartsherrie, the single chocks being in some cases as much as 6 ft. long. In many cases to avoid the waste of material instead of laying the chocks close to each other they are placed at some distance apart, and the space between filled with attle packing. As there is considerable liability in the case of heavy pressure of the packing forcing out the timbers, especially where the latter are round uncut timbers, it is advisable to notch the timbers slightly, and let them into one another, as is the case of the salt mines of Wieliczka. This kind of timbering is in frequent use in the various salt mines of Austria, and, as is evident, is principally suited for beds which lie nearly horizontal. It will seldom happen that the pillars fill exactly the space between the roof and floor, and there will generally be a few inches between the roof and the top of the pillars, which must be filled by planking and the like. The advantage of this kind of timbering is that the roof is not supported from several points but over a considerable area.

STEEL CORVE WHEELS AND AXLES.—At the recent meeting of the Midland Institute of Mining, Civil, and Mechanical Engineers Mr. MARCUS FENTON read a paper on the Patent Steel Corve Wheels and Axles manufactured by the Sheffield firm of which he was a member. He expressed the opinion that the more extended use of steel may lead to the more extended use of cast and wrought-iron in other directions. It was thought that the introduction of railways into the country would render horses of comparatively little use, whereas we all know how enormously the use of horses was developed by the introduction of the railway system. No doubt the period of transition is attended with some inconvenience, but in this age of progress no man can afford to stand still, because if the thing is right in theory and practice it is bound to go on. He stated that his firm had succeeded after almost numberless experiments in producing a kind of steel for wheels which they believe cannot be surpassed for toughness, and which in any case offers the utmost amount of resistance that can be desired—being practically indestructible. It is a widely different thing now when trains of corves are run by

steam-power at considerable speed to the old method of corf motion by boys. Enough has been said to indicate that the quality of material used is of the utmost importance, and that waste on one hand, and true economy on the other, will result according to the quality of material used. The wheel can be detached from the axle in a few minutes. The next advantage is the solidity attained, the wheel and axle practically becoming one piece. The durability results from the toughness of the material and the solidity secured in the fitting.

PATENT SMOKELESS FURNACES.

For very many years past the greatest bugbear in all our manufacturing towns has been the Smoke Nuisance. Inspectors have been appointed to watch chimneys to see how long they emit dense or other smoke, and a great deal of our magistrates' time was occupied in hearing and adjudicating upon the cases that were brought before them. Many inventions were brought out from time to time to consume the smoke before it reached the flue, but none may be said to have really succeeded, and in all places where there are chimneys in connection with manufactories and works at the present time volumes of smoke are still emitted and scattered in whatever direction the wind may chance to be. But there is certainly no necessity whatever why this should now be the case. We say this after examining and witnessing the working of Barbet's patent smokeless furnace a few days ago. We saw the furnace, two large boilers fed with small coal, and there was not the slightest emission of smoke from the top of the chimney. The furnace is simple of construction, and it has been found that small coal is most suitable for burning, and whilst there is less consumption than the ordinary furnace there is a larger amount of steam obtained without variation. In the front of the furnace there are three shelves and three sets of sloping grate bars. The coal is thrown frequently on to the shelves, and it is kept in front of the burning fuel, so that the air in passing into the fire first passes through the fresh coal. When the coal is thrown upon the shelves it is pushed forward as to carry before it the coked fuel of the previous firing. The upper level of the fresh fuel is kept in line with the front edge of the grate bars above, so that the points of the bars are kept cool. The fuel is pushed in from the lower shelf first, then the one above, and so on, but it is not put in so as to crowd any of it above the burning fuel. The sloping bars are kept covered with the coal, so that the fresh air cannot rush into the furnace. The ashes and clinkers are well managed, and they pass along the top part of the fire in the back part of the grate, from which they are removed by dropping in the front of the grate and taking them out. This is done quickly so as not to allow too much cold air to rush into the fire box and flue. There are no doors to open or shut, whilst the fireman's work is easy, and he is not overpowered with the heat. Another advantage is that the boilers are not so much affected as by the old system, consequently repairs are not so necessary so frequent. The furnace, owing to its simple construction, can be readily adapted to other descriptions of boilers, either stationary or locomotive, at comparatively small cost, and can be easily taken to pieces for repairs or renovation. Added to this the cost is not by any means heavy and is soon recouped by the saving effected in the consumption of fuel. The one we saw in operation was at the works of Messrs. Pigott and Farrar, Old Foundry, Barnsley.

UTILISATION OF MIXED ORES—No. IV.

TREATING AND SEPARATING CERTAIN COMPLEX METALLIC COMPOUNDS.

Referring to the particular ores and compounds to which his processes are applicable, Mr. Maxwell-Lyte mentions that Utah contains large deposits of argentiferous lead, finely disseminated through kind of friable siliceous rock. France, Spain, Portugal, Austria, and Norway have rich deposits of highly argentiferous lead in baryte matrix, and very superior qualities of rich argentiferous blast. These ores are untreatable by the amalgamation, and refractory under treatment by fusion, but are particularly fitted for treatment by the process of sulphatation. The precision of these processes is so great that under careful management industrial results are often obtainable superior to those of a laboratory assay. In some districts a large class of ores containing antimony, lead, and silver occur, the latter metal is generally in these cases very abundant. If such ore be smelted an alloy of the three metals is obtained, and if the antimony be over one-third of the weight of the lead the alloy is brittle, and can be pulverised, but by no known means can the antimony be obtained from this alloy in an available form; though it can be partially withdrawn from the lead by alloying with iron, forming an antimonide of that metal, it takes nearly not all the silver with it. Now, if the mixed metals be reduced together by fusion and the alloy be pulverised, sulphated, and treated with boiling neutral brine it yields up the whole of its lead as silver. Teroxide of antimony remaining behind insoluble, may be separated by subsidence from the hot solution or by the filter-press and may be fused into metallic antimony free from lead, while the lead and silver are precipitated by metallic zinc from the brine solution, and treated as above described. There is always a loss in treating this class of ores, not, however, nearly so great as would be involved in any other known process of separation, the loss lying principally with the antimony, which volatilizes; but it should never exceed 8 per cent. of the lead, 12 to 15 per cent. of the antimony, and 7 per cent. of the silver. Such losses must, however, be allowed for in purchasing these ores.

The brine process is, moreover, specially applicable for the recovery of lead from lead fume, lead ashes, and sulphate of lead produced in certain branches of industry; and it is also to be observed that although these processes are not directly applicable for the traction of gold from ores, still all of this metal which the ores may possibly contain remains with the gangue after the acid or brine treatment, and this residue is peculiarly well suited for the economical extraction of the gold by either amalgamation or by one of the chlorine processes. The capital requisite for establishing works for treating 20 tons of ore per day is estimated at 24,000l., which 14,000l. would be required for building plant; 6000l. for land, ore, zinc, and so on; and 4000l. for floating capital. With regard to the prices of the ores, it is impossible to attribute any price to that which at present sells for next to nothing, or is literally thrown away, but they are quoted as the approximate prices that might probably be asked when the new processes are generally known and largely worked. The profits though rather less than in England are still remarkably good, and are, it is believed, in all respects rather underrated than the contrary. The ore is more abundant in France and on other parts of the Continent than in England, and consequently the cost is somewhat lower. For this reason, which in itself, together with the fact of cheaper labour, will somewhat compensate the rather higher prices of the reagents, fuel, and so on, it has appeared to Mr. Maxwell-Lyte that it would be most specially advantageous to set up works in or near Paris on a moderate scale, where the processes could be demonstrated in view of selling royalties to the large numbers of persons who annually visit that capital. The successful working of the processes in England might not of necessity be considered a proof of their feasibility in other countries, this country being regarded as somewhat of an exception by foreigners; whereas their working at Paris, where they have already been successfully proved, will be considered sufficient to warrant their being employed anywhere. For these reasons Mr. Maxwell-Lyte has quoted French and not English prices, desiring to establish the works of demonstration there.

Some of the estimates given by Mr. Maxwell-Lyte are particularly interesting, as showing what excellent profits can be made from the treatment of ores which are usually difficult to deal with profitably. He first refers to a Laurium ore, which would be submitted to the chlorine process. Its composition is—zinc, 32.43 per cent.; lead, 19.25; volatile matters, 15; other soluble matters, 1.63; insoluble matters, 18.69 per cent.—100; it also contains 598 grammes of silver per ton of ore. He estimates that this ore would cost the works 95-25 frs. per ton, and that from it he would obtain 297-60 frs. worth of products at a cost of 289-77 frs.: leaving 17-83 frs.

* Being Notes on a Course of Lectures on Mining, delivered by Herr Bergstrath, Dr. von Gumboldt, Director of the Royal Bergakademie, Clausthal, The Harz, North Germany.

profit upon each ton treated. He puts hydrochloric acid at 16s. per ton, coal at 24s. per ton, and hard spelter at 12s. per ton. On the treatment of an ore from Haute Loire with 71 per cent. sulphate of pyrites, 25 per cent. of lead, 0.1 per cent. of silver, and much antimony by the sulphatation process he estimates a profit of 11.18s. 7d. per ton, or 11,580s. per annum, on treating 20 tons per day. Treatment of an ore from Nevada by the same process—although why a Nevada ore should send an ore to Paris to be treated is not very readily intelligible—he shows a profit of 6s. 4d. per ton, or 36,096s. per annum on treating 20 tons per day. Again, the treatment of a ton of lead ore is shown to yield 5s. 9s. 8d. per ton profit, or 3,901s. per annum treating 20 tons per day. In the same way the treatment of flue stuff yields 27,679s. per annum profit. For each of these estimates complete details are given, so that each capitalist disposed to entertain the matter can judge for himself. There is certainly nothing irrational in either of the processes, so that if the demand for the ores which would be created would not send up the price there is no reason why the project should not be successfully carried out.

THE GOLD REEFS OF CAPE JACKSON, NEW ZEALAND.

An interesting report has just been made to the Colonial Secretary by the Director of Geological Surveys—Dr. James Hector—on the Golden Point Quartz Reef, on the west side of Queen Charlotte Sound. The reef is 5 miles below Picton, at Pices Point, which forms the northern end of Powerful Bay. Under the shelter of the point within the bay are the peach groves and cultivations of the deserted Maori settlement of Kaipapa, where there is a small extent of available land, but elsewhere the country consists of narrow rocky ridges, with deep sides covered with scrub to the water edge. The prevailing geological formation along the west side of the Sound is a mica schist and clay-slate, both impregnated with quartz in irregular veins and laminae. These metamorphic rocks are similar to the schists of the Otago gold fields, and form a narrow belt, which extends from Cape Jackson south-west to the Wairau river. Indications of gold have been found in various parts of this area. At the Turner Mine, near Cape Jackson, a reef was formerly worked, and many rich specimens obtained; a piece collected by Dr. Hector in 1872 yielded 3 ozs. 6 dwts. per ton. (This mine has recently been acquired by the Ravenscliff Mining Company, of London, and is now being worked by them). On the Onamalu Creek, a tributary of the Wairau river, alluvial gold was extensively mined in 1869-70, followed by the discovery of the Sutherland reef, from which ore worth about 1 oz. per ton was obtained, but the reef never received a trial.

The Golden Point reef occurs under similar geological conditions to both the foregoing. The workings in the Golden Point Mine have hitherto been for the purpose of tracing the irregular leaders of quartz which are met with. North-west appears to be the prevailing course of mineral lodes in the district. A tunnel has been put in 50 ft., and at the end a shaft has been sunk 30 ft., and from the bottom a cross-level has been cut 17 ft. to the east and 19 ft. to the west. A thin leader is cut in the roof of the tunnel near the entrance. Several dishes of stuff from the leader roughly broken were sent on the spot, and in every case gold was obtained. One prospect got in this rough way was preserved and weighed, and gave 1 gr. to the dish, or about 1/2 oz. per ton. From the same place 15 lbs. of stone was taken, and yielded in the laboratory 14 ozs. 16 dwts. 5 grs. to the ton. The ground is tolerably dry considering that it is so close to the sea, and 25 ft. below tide-mark, and the leakage water being only faintly brackish proves that the ground is tight and favourable for deep working.

Dr. Hector considers the indications, on the whole, favourable; but that much work may be necessary before a defined reef is found at Golden Point. At the same time the analyses prove that some at least of the quartz leaders contain a remunerative percentage of gold, provided that their extreme irregularity does not make the mining operations too costly. Any further prospecting apart from working the leaders should, he thinks, be by a drive north-east from a point on the beach about 50 yards south of the mullocky reef outcrop, as it is most probable that all the leaders will make into a quartz lode, a reef lying to the west and north of the mine, but underlying to the eastward.

The correspondent in New Zealand who transmitted to us Dr. Hector's report informs us that a company has been formed in Wellington, with a capital of 10,000s., for the purpose of acquiring and working the Golden Point reefs, and that the shares were nearly all taken up before the prospectus was issued.

THE MINES AND MINERALS OF ARIZONA—No. I.

There can be no doubt that in the not far distant future both Arizona and New Mexico will be favourably known to the capitalists of this country as an attractive field for mining enterprise, and an excellent opportunity is afforded to them for acquiring much useful information concerning these territories from the admirable volume* just issued by Mr. RICHARD J. HINTON, who has certainly utilised the ability which he has acquired as a journalist in collecting material, in addition to which he appears to have received abundant assistance from officials and others in the district. The introductory chapters upon the geographical position and route to Arizona and an historical sketch admirably pave the way for the consideration of the physical and geological features which are referred to in the following chapter. A recognised authority and metallurgist, Henry Howe, states that "Silver Mining in Arizona possesses some great natural advantages over such mining in central Mexico. Its distinguishing feature is in the superior richness of the ores and in their geological position. Rich lodes cross each other at the surface. This confirms the theory of the origin of the deposits of silver in northern Mexico—that the portion of silver in the ore would be found to increase as you advance towards the north. This is accounted for geologically by the dip of the veins, the rich portion of which being near the surface at the north recedes from it as the lode tends southward until in New Mexico it is often found only at a depth of 1000 feet from the surface. The idea of improvement northward probably originated in the discovery of the famous lode of the *plata* (balls of silver) of Arizona in the beginning of last century. The vice-regal archives for the year 1738 leave no doubt upon the subject of the lode, and the decree of Philip V., dated August, May 28, 1741, still exists, the object of which was to terminate a prosecution instituted by the Royal Fiscal against the discoverers of Arizona for having defrauded the Treasury of duties payable upon the masses of pure silver found there. The decree states the weight of the *bolos*, *planchas*, y otras piezas de plata, discovered at 156 arrobas (4033 lbs.) in all, and mentions particularly one mass of pure silver which weighed 108 arrobas (2400 lbs.), and another of 11 arrobas, upon which duties had actually been paid by the King's agents, and which as a great natural curiosity (*cosa cosa especial*) the King states ought to have been sent to Madrid.

In the part of Mochochos, situated in the Sierra Madre between Tucson and Pinal, and near the Colorado, are found great masses of virgin iron, and abundant veins of the same metal cinnabar was discovered in 1802 in the hills of Santa Teresa in the mineral of Rio Chico, and in the hills at the mouth of the Colorado it has been found in the past age. Copper is also found in the Sierra de la Papagueria, and particularly in Coahuila, from which have been extracted great quantities of this metal, with a great ley of gold. Metals of lead (*metales plomeros*) abound in Agua Caliente, Alamo Muerto, La Papagueria, and elsewhere. The great silver belt of Arizona, so far as yet developed, commences about 40 miles south of the bend of the Colorado in the north-eastern part of the territory, and extends in a line varying in width from 40 to 80 miles south-easterly to the Gila river, and thence southerly to the Mexican line in the south-eastern portion of the territory. There is, however, a break in this line of about 70 miles to the northward of Tucson, to effect which scattered mines and dry placers are found in the western portion of Pima county, the mineral resources of which portion have been but little explored; to the extreme south-eastern portion of the territory, adjacent to the Chiricahui and Dragon Mountains, the same remark is applicable.

The copper region is scattered, the principal seat of this industry being at Clifton, in the extreme south-eastern part of Yavapai county, where the amount of rich copper ore is enormous, and less than 100 miles north-east from the recently discovered coal field of Arivaipa canyon. Copper combined with gold and silver, in very rich in the latter, abounds in the Globe mining district between the Apache and Pinal Mountains, and between the Gila and Salt rivers. It is also found on the 11th parallel, near the junction of Maricopa, Pima, and Yuma counties, at the old *Ajo* Mine, and to a small extent in various portions of Yuma county. It is worked largely and profitably at the Planet Mine, near Bill Williams river, part of Mojave county. Lead is not unknown in some of the Cerbat country, but unfortunately insufficient for the smelting processes necessary to extract the precious metals in a large proportion of the ores in that district; but it is probably obtained at the Pima and San Xavier Mines, south of Tucson; and there are indications of extensive deposits on the western slopes of the Santa Rita Mountains. In fact, the whole Santa Cruz region has more or less argentiferous galena, but the principal galena field in Arizona is in Yuma county, from which the completion of the railroad to the lead of Yuma and copper ores of the Globe district will be so brought together as largely to increase the value of both.

* "The Hand-Book to Arizona: its Resources, History, Towns, Mines, Ruins, and Scenery." By RICHARD J. HINTON. San Francisco: Payot, Upham, and Co.

metals magnetic iron is found in the schists of the Chiricahui mountains, near Camp Bowie, in sufficient quantities to give it some prospective value for local purposes. Iron in carbonates and oxides is also abundant in various portions of the territory; but industrial and manufacturing conditions are not yet such as to render it of special value. Platinum is found in the Black Canyon of the Colorado and on the Agua Fria. There are traces of tin in various localities, and of nickel in one place. Large beds of gypsum are reported on the San Pedro. Cinnabar has been found near Ehrenberg on the Mojave and Prescott roads, and at other points in the vicinity of Prescott, but has not yet been mined in paying quantities as far as known. Large salt deposits have been seen between the Dos Cabezas and Dragon mountains. The waters of the Salinas or Salt river have a brackish taste—hence its name. This is believed to come from the deposits or beds of rock salt in the canyon through which the steam finds its way. Salt is also found in small quantities near Sunset Crossing, on the Colorado-Chiquito; and there are said to be mountains a few miles east of the Colorado near Calville containing extensive deposits of pure, transparent, beautifully crystallised salt, unexcelled either for table or other use.

Passing from one extreme of necessity to another of luxury, blood-red garnets have been found in the Nacimiento desert, near Fort Defiance, scattered over loose sand, their surfaces indicating transportation probably from 50 miles northward, where they are found in syenite. And although a diamond swindle was based upon these facts it is none the less true that garnets have been found not only near the eastern border of Arizona but at its western border, at the same parallel on both sides of the Colorado river. When to these requirements of necessity and luxury, continues Mr. Hinton, we range that fact which probably made Great Britain the manufacturing centre of the world, nothing more than its agricultural facilities are requisite to make Arizona when its resources are developed the richest and most productive state in the Union. But its recent coal discoveries, filling up and cementing as they do its other vast resources of natural wealth, will be considered more in detail after some further outlines as to extent and abundance of its metals.

THE DESERT OF ATACAMA: ITS GEOLOGY AND MINERAL PRODUCTS.

Attention has already been called in the *Mining Journal* to the Desert of Atacama as a field for commercial enterprise, and as the Government of Chili have now issued an exhaustive pamphlet (with a copy of which we have been favoured by the Chilean Minister) descriptive of the great mineral fields of the district, it may be hoped that its development will not be longer delayed. With regard to the general aspect, it is stated that the description which has been usually given—that it is an extensive plain between two chains of mountains—is very far from being correct. The interior of the desert does not consist wholly of level plain, but is divided into large basins by intersecting ridges, the direction of which is approximately north-east to south-west. Between the parallels 28° and 27° there are four of these basins wherein may still be seen the dry channels of the ancient rivers which once irrigated these extensive regions. The northern basin embraces the whole of the space enclosed by the hills of Naguayan, Caracoles, and Atacama on the north. Its eastern boundary consists of part of the Andes range, which extends from the Volcans of Licancabur to Lullillalao. Its southern boundary is a range which, branching from the Varas Mountain, runs in the direction of the heights of Los Cordones and Cobre, and terminates on the coast by the hills of Jara and Jorgillo. This vast basin communicates with the Pacific Ocean through a deep gorge called the *Negra* in the vicinity of Antofagasta. The portion of this basin which is in Chilean territory comprises the plains of Palestina, de Aguas Blancas, and a part of the Valley of Mateo.

The second basin, that of Cachiuyal, is bounded on the north by the Peak of Cobre and by the Varas chain, on the east by the Vaguilla range as far as Chaco, thence by the Andes as far as the volcano of Dona Inez, and on the south by a range of hills which includes those of Hornillo and Cachiuyal. This basin opens into the port of Talta, and contains the most extensive tracts of level ground in the desert of Chili—those of the Prophete, Cachinil, Sandon, and the valley of the Eucanada, and the plains of Cachiuyal. The third basin is of more limited extent, and contains but few tracts of level ground; it is bounded on the north by the range last indicated, on the east by the volcano Dona Inez and the hill of Indio Muerto, and on the south by a range of hills which extends to the Cerro Negro and Carrizalillo. It consists of narrow valleys, and communicates with the sea in front of the Pan de Azucar. The fourth basin comprises the dry channel of the Salado river and the undulating tracts of land which formerly discharged their waters into it. The range which branches from the Cerro del Azufre skirting the elevated plain of Tres Puntas, and joining the coast chain close to Los Animas, constitutes its southern limit. The surface of this basin is very undulating, with no extensive plains, but consists of a series of long and narrow valleys. Although the four ranges which form the boundaries of these basins attain very considerable altitudes, they nowhere assume in the interior of the desert the character of precipitous hills, but rather that of hills of rounded form and gentle slopes. From these jut numerous spurs, which subdivide the large basins into plains of lesser magnitude, some of which are enclosed on all sides, and have apparently been the theatre of local and extensive lakes.

The geological structure of the Desert of Atacama is one of marked uniformity. The different formations are deposited in parallel beds dipping approximately north and south, and in such wise that in every part of the desert the same formations are found succeeding one another in the same order. In the neighbourhood of the sea, and forming the western watershed of the mountain chain which runs parallel with the coast, there occur stratified rocks which all belong to the azoic and palaeozoic periods; these are gneiss, schists, siliceous rocks, grawacke, and coloured sandstones. These stratified rocks are always much inclined, and are frequently intersected by masses of interposed plutonic rocks, amongst which may be noted granite and labradorites. Where the stratified formations come in contact with the hills formed by the plutonic rocks, the latter are intersected by numerous lines of a dark colour, which preserve a certain parallelism, and which are simply interleaved beds of the stratified formations which have been split up and become involved in the plutonic mass. The nature and age of these plutonic masses succeed one another in a definite order, the least ancient being situated more to the eastward, whilst on the eastern slope of the coast chain the syenitic rocks crop up, constituting the axis of this range of mountains. Near the coast are the stratified palaeozoic rocks, and in the highest part of the range the plutonic rocks, and in the highest part of this vast aggregation of mountains are the volcanic formations, in the midst of which rise up the extinct volcanoes of Azufre, Dona Inez, Chaco, and Lullillalao.

But what especially attracts attention on visiting the central region for the first time is its nakedness and uniformity, the plains and hills being covered with sand and small loose stones, which all retain their angular shape, and could not have been derived from alluvial deposits like those which cover the plains of Southern Chili. This vast amount of debris and scattered rocks has been the result of disintegration of the plutonic rocks, and from this great formation of detritus other deposits are derived, which, in sight of their importance, deserve a closer study. The deposits of nitrate of soda are found dispersed in the central part of the desert from 26° 30' to nearly 24° southern latitude. They only occur at a certain distance from the channels of the ancient rivers, and whether in the valleys or in the plains the richest portions are not met with in the centre, but on the narrow belts of the surrounding rising ground. It is under a bed of common salt that the nitrate of soda is met with in layers from 10 to 50 centimetres thick. In the other class of localities the salt does not appear on the surface, which consists of a bed of earth and small stones, but there are two certain signs by which its presence underneath is indicated. The first is the existence of small natural pits, which occur at intervals over the surface. The presence of chalcodony has also been regarded as an indication of salt-petre. The trial workings at Cachinil and Aguas Blancas are so very small in extent as compared with the nitrate area that it is quite impossible to form even an approximate estimate of the possible quantity of nitrates at these points. All that can be said is that it is certainly very large. Assuming 1,000,000 quintals as a fair annual yield, these two concessions would be workable for at least 200 years, and it may be said without the slightest exaggeration that the Chilean portion of the Desert of Atacama is capable of producing very large quantities of nitrate for more than a century.

The nitrate deposits, guano deposits, and deposits of borate of soda and lime occupy a large extent of the desert area; but in addition to these there are others of less value—metalliferous minerals—which are profusely distributed over the ground, there being scarcely any portion of the coast range from the 27th parallel to the Chilean frontier which does not contain some mineral veins; in proof of which it will be sufficient to mention the names of the mines of Salado, Las Animas, Cerro Negro, Carrizalillo, Cachiuyal, Paposo, and del Cobre, the most characteristically abundant amongst the minerals being copper ores; these are found more particularly in the eastern slope, where the syenitic rocks are traversed by intrusive bands of labradorite and augite porphyries, generally in veins between the two classes of rock, as though the igneous matters had filled the fractures produced by the later igneous intrusions. In other places they penetrate and are included in the porphyries, often forming considerable masses of ore, as at Carrizalillo. A very marked difference is observed between the minerals found in the veins according as they are in contact with the labradorite and augite porphyry, or the former case, after passing through the oxides, oxychlorides, and silicates of the granite, the ore is chiefly copper pyrites, while in the latter variegated copper, grey sulphides, and ruby ore prevail, the whole being as a rule markedly argentiferous.

The deposits of copper ores are not confined to the coast range but are also found at the foot of the Andes, where from the presence of augite porphyries the minerals are of the richer class of sulphides mentioned above. The distance of the mines from the coast, and the consequent high price of fuel, has hitherto prevented their being worked to profit, and only a single one—that of Sandon—is systematically worked. It is also in the eastern slopes of the Andes, and more particularly in rocks of Jurassic age, that silver ores are principally found, the veins bearing these minerals being intimately connected with the limestone of that period, and the subsequent eruptive masses of trachyte and augite porphyry. In most instances the veins are also at the contact of the two classes of rock, as in the former cases. The well-known mines of Chimbero and Tres Puntas are examples of deposits situated in the transverse ridges. Further north are the mines of La Florida, situated in a band of limestone forming part of the range that closes the basin of Salado to the north. A bed of augite porphyry running east and west has uplified two series of limestone beds, and in this neighbourhood the silver veins are found. Nearer to the base of the Andes we come to the mines of Sandon, and lastly near the Chilean frontier in about 24° south latitude are the mines of La Palestina. In addition to the above numerous veins of argentiferous galena are known, but up to the present time they have scarcely received any attention on account of the difficulty of working them to a profit. It may be hoped that the development of lines of communication consequent upon the opening up of the nitrate district will facilitate the means of exploring the other minerals of this region, so that they may in their turn be actively worked.

The Government appears disposed to do its utmost to open up the district, having had careful surveys made, with a view to improving the roads and means of communication, and a decree of June, 1877, provides for the formation of centres of population at Blanco Encalada and Talta; the former town is to consist of 28 blocks surrounding the ground reserved for the public plaza, and the latter of 11 blocks. The blocks are to be divided into about 1/4-acre plots, which are to be conceded to those who may ask for them, preference being given to those deprived of work by the May earthquake, in return for an undertaking to enclose and build upon them within six months. The houses of Benicande will henceforth be called the harbour of Blanco Encalada; it is found by careful observation to be in latitude 24° 22' 20" south, and longitude 70° 39' 51" west. At this place Mr. M. Sierralta, C.E., considers the produce of the nitre beds will find an easy outlet, and

he adds that he knows, from information derived from persons well acquainted with the localities, there is a sufficient field for a large development in the direction of copper and silver mining. It may be anticipated, therefore, that hereafter the desert of Atacama will be favourably known to British capitalists as a field for enterprise.

TRAMWAYS—THEIR CONSTRUCTION AND WORKING.

Although tramways are at present tolerated both in the London suburbs and elsewhere, there is no doubt that their advantages are fully counterbalanced by their inconveniences, and the great question to be decided is whether the objectionable features connected with them can be removed. To facilitate the accomplishment of this a complete volume,* the object of which is to place before engineers, capitalists, and financiers a succinct analysis of the past practice and the present achievements in tramways in the United Kingdom as works of engineering and as moneymaking concerns, has been written by Mr. D. KINNAR CLARK. He remarks that unassuming and unobtrusive as they are tramways have been the subject of a wide range of experience; by failures engineers have discovered what would not do, and as practical philosophers they have by induction arrived at the conditions for efficiency. Tramways, he says, cost half as much as railways, and they earn more money by the mile; they have involved as much blundering as railways; like railways they have exhausted professional reputations, and they have cost comparatively more than railways for working expenses. The origin and progress of tramways are first referred to, chapters being given on the introduction of tramways, modern tramways in the United Kingdom, tramways in the Metropolis and the Leeds tramways, the Glasgow Corporation tramways, Larsen's fastening, London street tramways and Belfast tramways, Dublin tramways, the Vale of Clyde tramways, reconstruction of the North Metropolitan tramways, with particulars of cost of London tramways and ironways—Livesey's, Cockburn Muir's, Kincaid's, Dowson's, and Sohen's. The second part of the book details the present practice of tramway construction in the United Kingdom, and gives detailed description and particulars of cost of the Edinburgh street tramways, of the Dundee street tramways, Glasgow Corporation tramways, Johnstone's and Rankine's system; Bristol, Leicester, and Salford tramways, Kincaid's system; Southport and Wirral tramways, Bolton's system; Manchester Corporation tramways, Barker's system; Liverpool tramways, Deacon's system; Robinson Souttar's system of tramways; harbour tramways; foreign tramways; and there is also a chapter of general conclusions on the design and construction of tramways. The general cost of tramways and their working expenditure are treated of in the third part, the concluding chapter of which consists of an admirable general analysis of the working expenditure. The total expenditure on tramways averages 1s. per mile run, and this is 75 per cent. of the gross receipts, which averages 18d. per mile run. The various kinds of cars in use in America, England, and France are described in the fourth part, and the concluding part is devoted to the consideration of the question of mechanical power on tramways, Mr. Clark being of opinion that tramways will not take their fitting place in their systems of transport in the United Kingdom until mechanical power is established for the power of horses.

The value of Mr. Clark's volume to practical tramway engineers will be considerable, since he has brought together all necessary information on every branch of the subject, and arranged it so systematically that it is extremely convenient for reference.

* "Tramways: their Construction and Working, embracing a comprehensive history of the system, &c., with special reference to the Tramways of the United Kingdom." By D. KINNAR CLARK, M.I.C.E. London: Crosby Lockwood and Co., Stationers' Hall-court.

THE PHONOGRAPH.—A pamphlet circulated by the patentees on exporters of the phonograph in this country gives the best account we have yet seen of that remarkable instrument. The phonograph has been described by Sir William Thomson as the most interesting mechanical invention of the century, and we are inclined to think that it is even a little more wonderful than the "telephone," which it has so soon followed and eclipsed. The telephone is, at present at least, by far the more useful instrument, and is quite a godsend to the Chinese, who, for want of any alphabet, are unable to use the ordinary means of telegraphic communication. The telephone does for us in a new and wonderful way precisely what the telegraph does for us—that is, it conveys speech instead of writing instantaneously to remote distances. But the phonograph does a thing which is quite new. It registers and stores up the mechanical product of sound in such a way that the original sound can be reproduced at any interval of time. The principle on which both instruments work is necessarily the same. Every sound and modification of sound is caused by a series of air waves or vibrations. These vibrations the telephone transmits and the phonograph registers and will reproduce, and this it will do so perfectly that all the three qualities, of sound—its pitch, its loudness, and its *timbre*, or quality—the first depending on the length of the sound waves, the second on their force, the third on their shape, are rendered with equal accuracy. In the words of the pamphlet, "with only a vibrating plate, a sheet of tin-foil, and a crank, it is possible to arrest and fix all kinds of sound, and, having preserved them as long as metals will hold their properties, to give them forth again in all their original qualities." Thus a machine "as simple as a coffee-mill" will give us back the product of the living processes of thought and speech, the highest and most delicate of all human functions. All that is necessary is that we should be careful to grind our mill at the same speed in giving out the sounds as in taking them in, lest they be converted either to superhuman shrillness or to an infra human bass. Even with this precaution the reproduction is not quite perfect, as we are told that "the voice is certainly somewhat muffled and minified (whatever that may mean) when returned from the iron tongue of the phonograph." Still the result is quite near enough, and indeed a good deal too near for our liking. Nothing so much belongs to a person, is so characteristic, so much a part of his inner self, as his voice and intonation. To recall these is almost to recall the spirit which breathed in them. It is not merely uncanny; it is sacrilegious. We are told that 300 years ago the phonograph would have been set down as a diabolical instrument and the phonographer dealt with accordingly. We have no desire to see Mr. Edison burnt at the stake, but we are not sure that we can say the same of his invention.

FINANCIAL REGISTER AND STOCK EXCHANGE MANUAL.—The sixth edition of the volume bearing this title—that for 1878—has just been issued by Mr. Edingham Wilson, of the Royal Exchange, but certainly, so far as its Mining information is concerned, reflects very little credit on the Editor, as the inaccuracies appear to be almost innumerable; but it will suffice to state that the defunct Burrow and Butson Company is stated to have for secretary a gentleman long since dead, Mr. Tooke is decried as secretary of the Emma, Mr. G. H. Cardozo as secretary of the Frontino and Bolivia, the Kapunda Company is located in Great Winchester-street, the late Mr. T. W. Hale is still secretary of the Richmond, and Mr. J. H. Hinchins of the Prince of Wales. Mr. J. Richard is secretary of West Chiverton, Mr. John Watson of Wheel Grenville, and this list might be continued almost indefinitely. The classes of securities referred to are—public funds, colonial and foreign debts, banking, finance, insurance, mining, railway, shipping, telegraph, water and gas, and other British and foreign joint stock companies.

A SOLID ACRE OF SILVER.—The Rocky Mountain Tourist says—"One of the most remarkable mines in California Gulch is in leads 3 ft. in thickness, the ore from which yields from 240 ozs to 270 ozs. of silver to the ton, and lies like a coal bank in a stratification of limestone, dipping about 15°. Two openings have been made at points 600 ft. apart, and sufficient ore is in sight to make millions of the 'dollars of our daddies.' The owners have gone far enough to know that there is a full acre of the ore in the one solid body, and some conception may be formed of the amazing richness of this discovery by a brief calculation of its dimensions. A cubic foot weighs 170 lbs., and as the ore lies 12 cubic feet make a ton. There are 43,560 square feet in an acre, and the acre of ore being 3 ft. in thickness makes 130,680 cubic feet, which with 12 cubic feet to the ton makes 10,890 tons, worth \$460 per ton, or the enormous value in the aggregate of \$2,700,000. The present is another mine worked like a coal bed, the ore lying horizontally in the large room that has been opened, the roof being held up by heavy timbers with very stout caps and tugging poles. The ore breasts from 1 ft. to 3 and 4 ft., and occasionally very fine specimens of horn silver are found."

INDIAN GOLD FIELDS.—The recently discovered gold field in Southern India, in the district of Wynad, the opening of which by the Elpha Mining Company was reported a few months ago, and which promises to become an important feature in the industries of our Eastern dependency, is not the only example of gold deposits of considerable value being worked in India. The Colar gold fields, in Mysore, which are being worked by the Coregam Gold Mining Company, are among the most ancient and extensive in India. The auriferous quartz reefs are said to extend for nearly 20 miles in length, and are believed to be of extreme richness. Hyder Ali and Tipu Sultan are said to have worked the mines in this locality, and there is a tradition that as long ago as 1293 Allageen, a General in the service of the Emperor of Delhi, invaded Mysore, and brought back with him an immense quantity of gold, which is believed to have been procured in the district of the mines now being opened out. The workings are situated at an elevation of 3800 ft. above the sea level, and the climate is healthy. There is a station on the Madras Railway 12 miles distant, so that the transport of the necessary plant for sinking the shafts and for other operations is effected without difficulty. If the operations in Mysore and at the Alpha Mining Company's works prove successful, a new and most important addition will be made to the mineral resources of the Empire. Hitherto gold has been found in very limited quantities in India, though it occurs in many parts of the country, and generally in stream gravels. It has been occasionally extracted in the North-West Himalayas, Chota Nagpur, Assam, Singapore, the Godavary Valley, and some other places. In the Punjab not more than three

made and Tiritó to
5s. to 7s. Chile
Flagstaff, 13s. 6d.
South Aurora, 2s.
oil companies' share
Hall and Young's fa-
ced better in mar-
6½d. per gallon, of
ars of miscellane-
have succeeded in
al from 250,000.
also the 7 per c
has been nothing

GREAT DYLIFFE LEAD MINING COMPANY (Limited).—A petition for winding-up this company by the Chancery Division of the High Court of Justice has been presented to the Master of the Rolls by Mr. Offley Bohun Shore, of Queen Anne's Mansions, Westminster, and the petition is directed to be heard before the Master of the Rolls on Friday, May 3.

Mining Correspondence.

BRITISH MINES.

ABERDAUNANT.—R. Toy, April 24: The lode in the 15 east continues the same as reported last week; there is no alteration whatever.

ASHFORD AND WEST ASHFORD.—G. Rickards, April 25: There is no material change to report during the last week in either of the mines. Our rate of dressing ore is very respectable, coming up to my calculations. Our sales and shipments for the month of April are as follow:—Lead ore, 6,254; copper (about) 100; old iron, 50; total, 718.

BEDFORD UNITED.—R. Goldsworthy, W. Phillips, April 16: The shaftmen have completed cutting ground for the plunger, connection, &c., and are now engaged in sinking and cutting ground for bearers and cistern below the 128 fm. level, where the lode is worth 15¢ per fathom. The lode in the 138 east has been taken down, and as far as seen is still worth 15¢ per fathom, and looking promising as the end is extended for further improvement. The lode in the 115 east is 3 ft. wide, and is looking good, composed of quartz, arsenical mud, and copper, worth for the two last 15¢ per fathom. The lode in the 103 east is 3 ft. wide, composed of congeal apatite, quartz, mud, and copper, worth 8¢ per fathom, and from its promising appearance we expect an early improvement. We have three stopes in the back of the 115—No. 1, worth 10¢ per fathom; No. 2, 6¢ per fathom; and No. 3, 8¢ per fathom. One stope in the back of the 103 is worth 8¢ per fathom. The rise in the back of the level west is at the present time unproductive. The tribute pitches are producing their usual quantity of ore. The mine continues to open out well, and with a fair advance in the price of copper will leave a good profit.

BEDFORD UNITED.—R. Goldsworthy, William Phillips, April 25: The lode in the engine-shaft, sinking below the 138, is worth 12¢ per fathom. There has been no lode taken down in the 138 east since last reported on. The lode in the 115 east is producing saving work. The lode in the 103 east is worth 6¢ per fm., and from its promising appearance we expect a further improvement. Three stopes in the back of the 115 and one in the 103 are worth on an average 7¢ per fm. We have two parcels of ore at Morvelham ready for sampling to-morrow; computed weight, 120 tons.

BETWYS Y COED.—H. G. Haley, April 22: The lode in the shaft is of the same promising character and appearance as reported last week, and worth for lead ore 30 cwt. per fathom. In the 20 fm. level, north branch, the lode is getting larger, and worth 30 cwt. of lead per fathom. In the 20, south branch, the lode is 3 ft. wide, with branches of lead ore and blende throughout, and will yield 15 cwt. of lead per fathom. In the deep adit the lode is producing a little lead, and to-day the men have cut another branch on the hanging or north side, which is looking very promising; I will advise you as to its value when sufficiently open. We shall commence to draw some nice ore from the ventilating shaft, on shallow adit to-morrow, as the men have cut down the shaft, &c., to draw through. No change to notice in the other places.

BLAEN CAELAN UNITED.—J. Pell, April 24: The winze sinking below the 20 is complete to the 30, and we shall after sinking a few feet for a pump to drain the water into commencing driving east, in order to come under the engine-shaft by the time the sinking to the 30 is completed—the distance to be driven is 20 fms. The engine-shaft is down 9 ft. below the 20 fm. level, and will very shortly take some part of the lode into the shaft. The value of the piece of ground to be laid open, estimating it from the 10 fms. seen in the winze, cannot be less than 8000, to 10,000, and there are indications of a very considerable thickening of the ore ground, which time will prove. The value of the mine would be greatly enhanced if the reserves laid open in this section of the mine. The run of old workings at the level of the adit have always let down much water into the mine, and caused inconvenience in sinking during wet weather for some months past, I have had men securing and puddling the bottom of this level, and it is now approaching completion, and will I hope prevent delay in sinking the engine shaft. The surface works are making satisfactory progress, the slime classifiers and self feeding buckets are making good progress, and the arrangements for purifying the water nearly finished. Took out license at the last magistrates' meeting for storing explosives, in accordance with the Act of Parliament, and must erect additions as the law requires to the powder magazine.

BLUE HILLS.—S. Bennett, A. Gripe, April 22: The 80 east end on the Pink lode is worth 1¢ per fathom. The same level east on the top lode is worth 12¢ per fathom, and west 6¢ per fathom. On the north lode the 30 east end is looking promising, and at present is worth 8¢ per fathom.

BODIDRIS.—H. Hotchkiss, April 23: I have no changes of importance to communicate this week. The different levels and cross cuts are being pushed on with all speed. We are also making good progress in clearing up the old shaft to the east of our present workings, and securing the same with stone. When this shaft is down the mine will be thoroughly ventilated, which will enable us to stop our ore ground at a cheaper rate.

CLEMENTINA.—J. Roberts, W. Bennett, April 24: The stope in the back of the adit level on the east and west lode is worth 1 ton of lead per fathom; this is a very important feature in the mine, inasmuch as the lode stands intact to surface, a height of 22 fms., and has been wrought on nowhere in the mine above this point, and we have reason to expect that we have a lasting piece of productive ground. We cannot urge too strongly the importance of erecting a larger water-wheel, so as to meet all contingencies relative to more power. **COMBARTIN.**—J. Harris, J. Comer, April 20: We have to-day set the following bargains: The 28 to drive west, on the course of the lode, west of Knight's cross-course, by four men, at 4¢ 10¢ per fathom, the month; we have cut into the lode about 3 ft., but have not reached the north wall, and so far as cut into the lode has produced mud, blende, and stones of good silver-lead; altogether the lode has a very kindly appearance. The 15 to drive east of Harris's shaft, by four men, at 4¢ 5¢ per fathom, the month; the lode is 15 ft. wide, containing quartz and blende, with strings of lead throughout, and has a most encouraging appearance. The adit cross cut to drive north towards Harris's lode, by four men, at 2¢ 10¢ per fathom, the month; the end is in most congenial looking killas for the production of lead, and we are expecting to intersect another of our lodes very shortly.

COMBARTIN.—T. Comer, April 25: In the 28, driving west of Knight's cross-course, from Harris's shaft, the lode is from 4 ft. to 5 ft. wide, strong and masterly; producing a little saving work for silver-lead and blende; a very promising lode for a future improvement. The other points are without alteration.

COURT GRANGE.—J. G. Green, April 18: I am pleased to be able to report a good improvement in the 30 driving east; the total width of the lode is 11 ft., carrying a nice leader of leadstap on the north 3 ft.; worth 15¢ per fathom. On the south there is a good mixture of blende for 3 ft. wide, worth 15¢ per fathom for this mineral. The lode in the 14 is not quite so productive as it has been; this, however, I regard as but temporary, and an improvement can be confidently relied upon. No other change calling for remark. At surface very excellent progress is being made, weather being most favourable. In cutting the new water-course from head of drawing wheel to the Brogan pond we have come across the back of a new lode running nearly parallel with the old lode, at a distance of 100 fms. about to the south. There will be a good opportunity in a little time to give this a good trial by driving a cross-cut south from engine-shaft at the 80, should it prove rich the value of the mine would be greatly enhanced.

CWMYSTWTH.—April 23: Gill's upper level to drive east on the new lode; the lode for the last 3 ft. driving has not been quite so productive for lead, containing more blende, now worth 5 cwt. of lead ore per fathom. A winze to sink in the bottom of Mitchell's, east of cross-cut, on new lode; here only part of the lode has been taken down, which contains nice branches of lead ore, but the main part of the lode is still standing to the north, which will be cut through as we get deeper. Mitchell's level to drive north by rock-drill. We are pushing on this cross-cut with full force, and hope to reach the other lode seen at surface in about 40 fms. more driving. The end is in most congenial looking killas for the production of lead, and we are expecting to intersect another of our lodes very shortly.

DE BROKE.—J. Phillips, April 24: The ground in Wilson's shaft, sinking below the 45, continues favourable, but the water has rather increased. There is no change in the lode. The ground in the 45, driving east of Wilson's, is easier, and the lode producing good stones of lead ore at present as a large quantity of sulphur. No lode has recently been taken down in the 45 west. The lode in the Trial Drift, east of the 25 stope, is harder than it has been, and is unproductive at present. The stopes are yielding just as usual. We have commenced a trial stope, east of the winze, from the 25 to the 35, and from present appearance it is likely to open some paying ore ground. We are pushing ahead with dressing ore.

DERESBY CONSOLS.—William Bennett, John Roberts, April 24: There is nothing new in the deep adit level since last week's report. We are daily expending for although being 200 fms. further north we have not yet struck the lode in the deep adit and to cut the Cobble's lode that has proved itself to be so very rich at surface, and as far down as it could be followed with the water.

DERESBY MOUNTAIN.—J. Roberts, Wm. Bennett, April 24: No. 5 Adit: We have made good progress in clearing here this week, having got through entirely the long length that had been totally collapsed, and 20 fms. beyond that point. We beg here to state that notwithstanding the importance of No. 4 adit, and the assurance of the continuance of that course of lead to and below the No. 5, yet here 200 fms. north there are prospects which we consider are in no wise inferior, for although being 200 fms. further north we have not yet struck the lode in the deep adit and to cut the Cobble's lode that has proved itself to be so very rich at surface, and as far down as it could be followed with the water.

DERESBY MOUNTAIN.—J. Roberts, Wm. Bennett, April 24: No. 5 Adit: We have made good progress in clearing here this week, having got through entirely the long length that had been totally collapsed, and 20 fms. beyond that point. We beg here to state that notwithstanding the importance of No. 4 adit, and the assurance of the continuance of that course of lead to and below the No. 5, yet here 200 fms. north there are prospects which we consider are in no wise inferior, for although being 200 fms. further north we have not yet struck the lode in the deep adit and to cut the Cobble's lode that has proved itself to be so very rich at surface, and as far down as it could be followed with the water.

DERESBY MOUNTAIN.—J. Roberts, Wm. Bennett, April 24: No. 5 Adit: We have made good progress in clearing here this week, having got through entirely the long length that had been totally collapsed, and 20 fms. beyond that point. We beg here to state that notwithstanding the importance of No. 4 adit, and the assurance of the continuance of that course of lead to and below the No. 5, yet here 200 fms. north there are prospects which we consider are in no wise inferior, for although being 200 fms. further north we have not yet struck the lode in the deep adit and to cut the Cobble's lode that has proved itself to be so very rich at surface, and as far down as it could be followed with the water.

DERESBY MOUNTAIN.—J. Roberts, Wm. Bennett, April 24: No. 5 Adit: We have made good progress in clearing here this week, having got through entirely the long length that had been totally collapsed, and 20 fms. beyond that point. We beg here to state that notwithstanding the importance of No. 4 adit, and the assurance of the continuance of that course of lead to and below the No. 5, yet here 200 fms. north there are prospects which we consider are in no wise inferior, for although being 200 fms. further north we have not yet struck the lode in the deep adit and to cut the Cobble's lode that has proved itself to be so very rich at surface, and as far down as it could be followed with the water.

of ore per cubic fathom. The 93, 136 fms. west of shaft, which a month ago was yielding 5 cwt. of ore per fathom, is now double that value; the vein is 3 feet wide, and hopful. No. 1 stope, in the back of the same, 22 fathoms behind the end, for about 6 feet high is poor, but the upper portion (say 4 feet) is good, and leaving good roofs; this stope is 4 ft. wide, and worth on the average for the whole height 12 cwt. of ore per fathom. No. 2 stope is 4 ft. wide, and produces 24 cwt. of ore per fathom. No. 3, for some time past very poor, is gradually improving, now 3 ft. wide, and worth 10 cwt. of ore per fathom. No. 4 is 5 feet wide, value 12 cwt. The sides, 94 fms. west of shaft, yield 24 cwt. of ore per cubic fathom.—Sun Vein: This vein, in the level under the 70, 18 fathoms west of shaft, is small, 1 ft. wide, and poor, but continues to promise well for Little Limestone, over the above. We have resumed the stope in back of this level, 8 fms. west of shaft, where the vein is 3 ft. wide, and yields 9 cwt. of ore per fathom. This vein, east of shaft, where we are driving and stopping under the 70, 13 fms. from shaft, during last month became twined and much poorer; its present size is 2 feet wide, and its worth 12 cwt. The stope in the back is 3 ft. wide, worth 21 cwt., and re-set at 53s. per fathom. The stope under the 40, 44 fms. east of shaft, is 1 ft. wide, and poor, worth about 4 cwt. We have reduced the men in this place to two.—Wagon Shaft—Middle Vein: The 93, 70 fms. east of shaft is driving mainly by the side of the lode, and continues to promise well for Little Limestone, over the above. We have resumed the stope in back of this level, 8 fms. west of shaft, where the vein is 3 ft. wide, and yields 9 cwt. of ore per fathom. This vein, east of shaft, where we are driving and stopping under the 70, 13 fms. from shaft, during last month became twined and much poorer; its present size is 2 feet wide, and its worth 12 cwt. The stope in the back is 3 ft. wide, worth 21 cwt., and re-set at 53s. per fathom. The stope under the 40, 44 fms. east of shaft, is 1 ft. wide, and poor, worth about 4 cwt. We have reduced the men in this place to two.—Wagon Shaft—Middle Vein: The 93, 70 fms. east of shaft is driving mainly by the side of the lode, and continues to promise well for Little Limestone, over the above. We have resumed the stope in back of this level, 8 fms. west of shaft, where the vein is 3 ft. wide, and yields 9 cwt. of ore per fathom. This vein, east of shaft, where we are driving and stopping under the 70, 13 fms. from shaft, during last month became twined and much poorer; its present size is 2 feet wide, and its worth 12 cwt. The stope in the back is 3 ft. wide, worth 21 cwt., and re-set at 53s. per fathom. The stope under the 40, 44 fms. east of shaft, is 1 ft. wide, and poor, worth about 4 cwt. We have reduced the men in this place to two.—Wagon Shaft—Middle Vein: The 93, 70 fms. east of shaft is driving mainly by the side of the lode, and continues to promise well for Little Limestone, over the above. We have resumed the stope in back of this level, 8 fms. west of shaft, where the vein is 3 ft. wide, and yields 9 cwt. of ore per fathom. This vein, east of shaft, where we are driving and stopping under the 70, 13 fms. from shaft, during last month became twined and much poorer; its present size is 2 feet wide, and its worth 12 cwt. The stope in the back is 3 ft. wide, worth 21 cwt., and re-set at 53s. per fathom. The stope under the 40, 44 fms. east of shaft, is 1 ft. wide, and poor, worth about 4 cwt. We have reduced the men in this place to two.—Wagon Shaft—Middle Vein: The 93, 70 fms. east of shaft is driving mainly by the side of the lode, and continues to promise well for Little Limestone, over the above. We have resumed the stope in back of this level, 8 fms. west of shaft, where the vein is 3 ft. wide, and yields 9 cwt. of ore per fathom. This vein, east of shaft, where we are driving and stopping under the 70, 13 fms. from shaft, during last month became twined and much poorer; its present size is 2 feet wide, and its worth 12 cwt. The stope in the back is 3 ft. wide, worth 21 cwt., and re-set at 53s. per fathom. The stope under the 40, 44 fms. east of shaft, is 1 ft. wide, and poor, worth about 4 cwt. We have reduced the men in this place to two.—Wagon Shaft—Middle Vein: The 93, 70 fms. east of shaft is driving mainly by the side of the lode, and continues to promise well for Little Limestone, over the above. We have resumed the stope in back of this level, 8 fms. west of shaft, where the vein is 3 ft. wide, and yields 9 cwt. of ore per fathom. This vein, east of shaft, where we are driving and stopping under the 70, 13 fms. from shaft, during last month became twined and much poorer; its present size is 2 feet wide, and its worth 12 cwt. The stope in the back is 3 ft. wide, worth 21 cwt., and re-set at 53s. per fathom. The stope under the 40, 44 fms. east of shaft, is 1 ft. wide, and poor, worth about 4 cwt. We have reduced the men in this place to two.—Wagon Shaft—Middle Vein: The 93, 70 fms. east of shaft is driving mainly by the side of the lode, and continues to promise well for Little Limestone, over the above. We have resumed the stope in back of this level, 8 fms. west of shaft, where the vein is 3 ft. wide, and yields 9 cwt. of ore per fathom. This vein, east of shaft, where we are driving and stopping under the 70, 13 fms. from shaft, during last month became twined and much poorer; its present size is 2 feet wide, and its worth 12 cwt. The stope in the back is 3 ft. wide, worth 21 cwt., and re-set at 53s. per fathom. The stope under the 40, 44 fms. east of shaft, is 1 ft. wide, and poor, worth about 4 cwt. We have reduced the men in this place to two.—Wagon Shaft—Middle Vein: The 93, 70 fms. east of shaft is driving mainly by the side of the lode, and continues to promise well for Little Limestone, over the above. We have resumed the stope in back of this level, 8 fms. west of shaft, where the vein is 3 ft. wide, and yields 9 cwt. of ore per fathom. This vein, east of shaft, where we are driving and stopping under the 70, 13 fms. from shaft, during last month became twined and much poorer; its present size is 2 feet wide, and its worth 12 cwt. The stope in the back is 3 ft. wide, worth 21 cwt., and re-set at 53s. per fathom. The stope under the 40, 44 fms. east of shaft, is 1 ft. wide, and poor, worth about 4 cwt. We have reduced the men in this place to two.—Wagon Shaft—Middle Vein: The 93, 70 fms. east of shaft is driving mainly by the side of the lode, and continues to promise well for Little Limestone, over the above. We have resumed the stope in back of this level, 8 fms. west of shaft, where the vein is 3 ft. wide, and yields 9 cwt. of ore per fathom. This vein, east of shaft, where we are driving and stopping under the 70, 13 fms. from shaft, during last month became twined and much poorer; its present size is 2 feet wide, and its worth 12 cwt. The stope in the back is 3 ft. wide, worth 21 cwt., and re-set at 53s. per fathom. The stope under the 40, 44 fms. east of shaft, is 1 ft. wide, and poor, worth about 4 cwt. We have reduced the men in this place to two.—Wagon Shaft—Middle Vein: The 93, 70 fms. east of shaft is driving mainly by the side of the lode, and continues to promise well for Little Limestone, over the above. We have resumed the stope in back of this level, 8 fms. west of shaft, where the vein is 3 ft. wide, and yields 9 cwt. of ore per fathom. This vein, east of shaft, where we are driving and stopping under the 70, 13 fms. from shaft, during last month became twined and much poorer; its present size is 2 feet wide, and its worth 12 cwt. The stope in the back is 3 ft. wide, worth 21 cwt., and re-set at 53s. per fathom. The stope under the 40, 44 fms. east of shaft, is 1 ft. wide, and poor, worth about 4 cwt. We have reduced the men in this place to two.—Wagon Shaft—Middle Vein: The 93, 70 fms. east of shaft is driving mainly by the side of the lode, and continues to promise well for Little Limestone, over the above. We have resumed the stope in back of this level, 8 fms. west of shaft, where the vein is 3 ft. wide, and yields 9 cwt. of ore per fathom. This vein, east of shaft, where we are driving and stopping under the 70, 13 fms. from shaft, during last month became twined and much poorer; its present size is 2 feet wide, and its worth 12 cwt. The stope in the back is 3 ft. wide, worth 21 cwt., and re-set at 53s. per fathom. The stope under the 40, 44 fms. east of shaft, is 1 ft. wide, and poor, worth about 4 cwt. We have reduced the men in this place to two.—Wagon Shaft—Middle Vein: The 93, 70 fms. east of shaft is driving mainly by the side of the lode, and continues to promise well for Little Limestone, over the above. We have resumed the stope in back of this level, 8 fms. west of shaft, where the vein is 3 ft. wide, and yields 9 cwt. of ore per fathom. This vein, east of shaft, where we are driving and stopping under the 70, 13 fms. from shaft, during last month became twined and much poorer; its present size is 2 feet wide, and its worth 12 cwt. The stope in the back is 3 ft. wide, worth 21 cwt., and re-set at 53s. per fathom. The stope under the 40, 44 fms. east of shaft, is 1 ft. wide, and poor, worth about 4 cwt. We have reduced the men in this place to two.—Wagon Shaft—Middle Vein: The 93, 70 fms. east of shaft is driving mainly by the side of the lode, and continues to promise well for Little Limestone, over the above. We have resumed the stope in back of this level, 8 fms. west of shaft, where the vein is 3 ft. wide, and yields 9 cwt. of ore per fathom. This vein, east of shaft, where we are driving and stopping under the 70, 13 fms. from shaft, during last month became twined and much poorer; its present size is 2 feet wide, and its worth 12 cwt. The stope in the back is 3 ft. wide, worth 21 cwt., and re-set at 53s. per fathom. The stope under the 40, 44 fms. east of shaft, is 1 ft. wide, and poor, worth about 4 cwt. We have reduced the men in this place to two.—Wagon Shaft—Middle Vein: The 93, 70 fms. east of shaft is driving mainly by the side of the lode, and continues to promise well for Little Limestone, over the above. We have resumed the stope in back of this level, 8 fms. west of shaft, where the vein is 3 ft. wide, and yields 9 cwt. of ore per fathom. This vein, east of shaft, where we are driving and stopping under the 70, 13 fms. from shaft, during last month became twined and much poorer; its present size is 2 feet wide, and its worth 12 cwt. The stope in the back is 3 ft. wide, worth 21 cwt., and re-set at 53s. per fathom. The stope under the 40, 44 fms. east of shaft, is 1 ft. wide, and poor, worth about 4 cwt. We have reduced the men in this place to two.—Wagon Shaft—Middle Vein: The 93, 70 fms. east of shaft is driving mainly by the side of the lode, and continues to promise well for Little Limestone, over the above. We have resumed the stope in back of this level, 8 fms. west of shaft, where the vein is 3 ft. wide, and yields 9 cwt. of ore per fathom. This vein, east of shaft, where we are driving and stopping under the 70, 13 fms. from shaft, during last month became twined and much poorer; its present size is 2 feet wide, and its worth 12 cwt. The stope in the back is 3 ft. wide, worth 21 cwt., and re-set at 53s. per fathom. The stope under the 40, 44 fms. east of shaft, is 1 ft. wide, and poor, worth about 4 cwt. We have reduced the men in this place to two.—Wagon Shaft—Middle Vein: The 93, 70 fms. east of shaft is driving mainly by the side of the lode, and continues to promise well for Little Limestone, over the above. We have resumed the stope in back of this level, 8 fms. west of shaft, where the vein is 3 ft. wide, and yields 9 cwt. of ore per fathom. This vein, east of shaft, where we are driving and stopping under the 70, 13 fms. from shaft, during last month became twined and much poorer; its present size is 2 feet wide, and its worth 12 cwt. The stope in the back is 3 ft. wide, worth 21 cwt., and re-set at 53s. per fathom. The stope under the 40, 44 fms. east of shaft, is 1 ft. wide, and poor, worth about 4 cwt. We have reduced the men in this place to two.—Wagon Shaft—Middle Vein: The 93, 70 fms. east of shaft is driving mainly by the side of the lode, and continues to promise well for Little Limestone, over the above. We have resumed the stope in back of this level, 8 fms. west of shaft, where the vein is 3 ft. wide, and yields 9 cwt. of ore per fathom. This vein, east of shaft, where we are driving and stopping under the 70, 13 fms. from shaft, during last month became twined and much poorer; its present size is 2 feet wide, and its worth 12 cwt. The stope in the back is 3 ft. wide, worth 21 cwt., and re-set at 53s. per fathom. The stope under the 40, 44 fms. east of shaft, is 1 ft. wide, and poor, worth about 4 cwt. We have reduced the men in this place to two.—Wagon Shaft—Middle Vein: The 93, 70 fms. east of shaft is driving mainly by the side of the lode, and continues to promise well for Little Limestone, over the above. We have resumed the stope in back of this level, 8 fms. west of shaft, where the vein is 3 ft. wide, and yields 9 cwt. of ore per fathom. This vein, east of shaft, where we are driving and stopping under the 70, 13 fms. from shaft, during last month became twined and much poorer; its present size is 2 feet wide, and its worth 12 cwt. The stope in the back is 3 ft. wide, worth 21 cwt., and re-set at 53s. per fathom. The stope under the 40, 44 fms. east of shaft, is 1 ft. wide, and poor, worth about 4 cwt. We have reduced the men in this place to two.—Wagon Shaft—Middle Vein: The 93, 70 fms. east of shaft is driving mainly by the side of the lode, and continues to promise well for Little Limestone, over the above. We have resumed the stope in back of this level, 8 fms. west of shaft, where the vein is 3 ft. wide, and yields 9 cwt. of ore per fathom. This vein, east of shaft, where we are driving and stopping under the 70, 13 fms. from shaft, during last month became twined and much poorer; its present size is 2 feet wide, and its worth 12 cwt. The stope in the back is 3 ft. wide, worth 21 cwt., and re-set at 53s. per fathom. The stope under the 40, 44 fms. east of shaft, is 1 ft. wide, and poor, worth about 4 cwt. We have reduced the men in this place to two.—Wagon Shaft—Middle Vein: The 93, 70 fms. east of shaft is driving mainly by the side of the lode, and continues to promise well for Little Limestone, over the above. We have resumed the stope in back of this level, 8 fms. west of shaft, where the vein is 3 ft. wide, and yields 9 cwt. of ore per fathom. This vein, east of shaft, where we are driving and stopping under the 70, 13 fms. from shaft, during last month became twined and much poorer; its present size is 2 feet wide, and its worth 12 cwt. The stope in the back is 3 ft. wide, worth 21 cwt., and re-set at 53s. per fathom. The stope under the 40, 44 fms. east of shaft, is 1 ft. wide, and poor, worth about 4 cwt. We have reduced the men in this place to two.—Wagon Shaft—Middle Vein: The 93, 70 fms. east of shaft is driving mainly by the side of the lode, and continues to promise well for Little Limestone, over the above. We have resumed the stope in back of this level, 8 fms. west of shaft, where the vein is 3 ft. wide, and yields 9 cwt. of ore per fathom. This vein, east of shaft, where we are driving and stopping under the 70, 13 fms. from shaft, during last month became twined and much poorer; its present size is 2 feet wide, and its worth 12 cwt. The stope in the back is 3 ft. wide, worth 21 cwt., and re-set at 53s. per fathom. The stope under the 40, 44 fms. east of shaft, is 1 ft. wide, and poor, worth about 4 cwt. We have reduced the men in this place to two.—Wagon Shaft—Middle Vein: The 93, 70 fms. east of shaft is driving mainly by the side of the lode, and continues to promise well for Little Limestone, over the above. We have resumed the stope in back of this level, 8 fms. west of shaft, where the vein is 3 ft. wide, and yields 9 cwt. of ore per fathom. This vein, east of shaft, where we are driving and stopping under the 70, 13 fms. from shaft, during last month became twined and much poorer; its present size is 2 feet wide, and its worth 12 cwt. The stope in the back is 3 ft. wide, worth 21 cwt., and re-set at 53s. per fathom. The stope under the 40, 44 fms. east of shaft, is 1 ft. wide, and poor, worth about 4 cwt. We have reduced the men in this place to two.—Wagon Shaft—Middle Vein: The 93, 70 fms. east of shaft is driving mainly by the side of the lode, and continues to promise well for Little Limestone, over the above. We have resumed the stope in back of this level, 8 fms. west of shaft, where the vein is 3 ft. wide, and yields 9 cwt. of ore per fathom. This vein, east of shaft, where we are driving and stopping under the 70, 13 fms. from shaft, during last month became twined and much poorer; its present size is 2 feet wide, and its worth 12 cwt. The stope in the back is 3 ft. wide, worth 21 cwt., and re-set at 53s. per fathom. The stope under the 40, 44 fms. east of shaft, is 1 ft. wide, and poor, worth about 4 cwt. We have reduced the men in this place to two.—Wagon Shaft—Middle Vein: The 93, 70 fms. east of shaft is driving mainly by the side of the lode, and continues to promise well for Little Limestone, over the above. We have resumed the stope in back of this level, 8 fms. west of shaft, where the vein is 3 ft. wide, and yields 9 cwt. of ore per fathom. This vein, east of shaft, where we are driving and stopping under the 70, 13 fms. from shaft, during last month became twined and much poorer; its present size is 2 feet wide, and its worth 12 cwt. The stope in the back is 3 ft. wide, worth 21 cwt., and re-set at 53s. per fathom. The stope under the 40, 44 fms. east of shaft, is 1 ft. wide, and poor, worth about 4 cwt. We have reduced the men in this place to two.—Wagon Shaft—Middle Vein: The 93, 70 fms. east of shaft is driving mainly by the side of the lode, and continues to promise well for Little Limestone, over the above. We have resumed the stope in back of this level, 8 fms. west of shaft, where the vein is 3 ft. wide, and yields 9 cwt. of ore per fathom. This vein, east of shaft, where we are driving and stopping under the 70, 13 fms. from shaft, during last month became twined and much poorer; its present size is 2 feet wide, and its worth 12 cwt. The stope in the back is 3 ft. wide, worth 21 cwt., and re-set at 53s. per fathom. The stope under the 40, 44 fms. east of shaft, is 1 ft. wide, and poor, worth about 4 cwt. We have reduced the men in this place to two.—Wagon Shaft—Middle Vein: The 93, 70 fms. east of shaft is driving mainly by the side of the lode, and continues to promise well for Little Limestone, over the above. We have resumed the stope in back of this level, 8 fms. west of shaft, where the vein is 3 ft. wide, and yields 9 cwt. of ore per fathom. This vein, east of shaft, where we are driving and stopping under the 70, 13 fms. from shaft, during last month became twined and much poorer; its present size is 2 feet wide, and its worth 12 cwt. The stope in the back is 3 ft. wide, worth 21 cwt., and re-set at 53s. per fathom. The stope under the 40, 44 fms. east of shaft, is 1 ft. wide, and poor, worth about 4 cwt. We have reduced the men in this place to two.—Wagon Shaft—Middle Vein: The 93, 70 fms. east of shaft is driving mainly by the side of the lode, and continues to promise well for Little Limestone, over the above. We have resumed the stope in back of this level, 8 fms. west of shaft, where the vein is 3 ft. wide, and yields 9 cwt. of ore per fathom. This vein, east of shaft, where we are driving and stopping under the 70, 13 fms. from shaft, during last month became twined and much poorer; its present size is 2 feet wide, and its worth 12 cwt. The stope in the back is 3 ft. wide, worth 21 cwt., and re-set at 53s. per fathom. The stope under the 40, 44 fms. east of shaft, is 1 ft. wide, and poor, worth about 4 cwt. We have reduced the men in this place to two.—Wagon Shaft—Middle Vein: The 93, 70 fms. east of shaft is driving mainly by the side of the lode, and continues to promise well for Little Limestone, over the above. We have resumed the stope in back of this level, 8 fms. west of shaft, where the vein is 3 ft. wide, and yields 9 cwt. of ore per fathom. This vein, east of shaft, where we are driving and stopping under the 70, 13 fms. from shaft, during last month became twined and much poorer; its present size is 2 feet wide, and its worth 12 cwt. The stope in the back is 3 ft. wide, worth 21 cwt., and re-set at 53s. per fathom. The stope under the 40, 44 fms. east of shaft, is 1 ft. wide, and poor, worth about 4 cwt. We have reduced the men in this place to two.—Wagon Shaft—Middle Vein: The 93, 70 fms. east of shaft is driving mainly by the side of the lode, and continues to promise well for Little Limestone, over the above. We have resumed the stope in back of this level, 8 fms. west of shaft, where the vein is 3 ft. wide, and yields 9 cwt. of ore per fathom. This vein, east of shaft, where we are driving and stopping under the 70, 13 fms. from shaft, during last month became twined and much poorer; its present size is 2 feet wide, and its worth 12 cwt. The stope in the back is 3 ft. wide, worth 21 cwt., and re-set at 53s. per fathom. The stope under the 40, 44 fms. east of shaft, is 1 ft. wide, and poor, worth about 4 cwt. We have reduced the men in this place to two.—Wagon Shaft—Middle Vein: The 93, 70 fms. east of shaft is driving mainly by the side of the lode, and continues to promise well for Little Limestone, over the above. We have resumed the stope in back of this level, 8 fms. west of shaft, where the vein is 3 ft. wide, and yields 9 cwt. of ore per fathom. This vein, east of shaft, where we are driving and stopping under the 70, 13 fms. from shaft, during last month became twined and much poorer; its present size is 2 feet wide, and its worth 12 cwt. The stope in the back is 3 ft. wide, worth 21 cwt., and re-set at 53s. per fathom. The stope under the 40, 44 fms. east of shaft, is 1 ft. wide, and poor, worth about 4 cwt. We have reduced the men in this place to two.—Wagon Shaft—Middle Vein: The 93, 70 fms. east of shaft is driving mainly by the side of the lode, and continues to promise well for Little Limestone, over the above. We have resumed the stope in back of this level, 8 fms. west of shaft, where the vein is 3 ft. wide, and yields 9 cwt. of ore per fathom. This vein, east of shaft, where we are driving and stopping under the 70, 13 fms. from shaft, during last month became twined and much poorer; its present size is 2 feet wide, and its worth 12 cwt. The stope in the back is 3 ft. wide, worth 21 cwt., and re-set at 53s. per fathom. The stope under the 40, 44 fms. east of shaft, is 1 ft. wide, and poor, worth about 4 cwt. We have reduced the men in this place to two.—Wagon Shaft—Middle Vein: The 93, 70 fms. east of shaft is driving mainly by the side of the lode, and continues to promise well for Little Limestone, over the above. We have resumed the stope in back of this level, 8 fms. west of shaft, where the vein is 3 ft. wide, and yields 9 cwt. of ore per fathom. This vein, east of shaft, where we are driving and stopping under the 70, 13 fms. from shaft, during last month became twined and much poorer; its present size is 2 feet wide, and its worth 12 cwt. The stope in the back is 3 ft. wide, worth 21 cwt., and re-set at 53s. per fathom. The stope under the 40, 44 fms. east of shaft, is 1 ft. wide, and poor, worth about 4 cwt. We have reduced the men in this place to two.—Wagon Shaft—Middle Vein: The 93, 70 fms. east of shaft is driving mainly by the side of the lode, and continues to promise well for Little Limestone, over the above. We have resumed the stope in back of this level, 8 fms. west of shaft, where the vein is 3 ft. wide, and yields 9 cwt. of ore per fathom. This vein, east of shaft, where we are driving and stopping under the 70, 13 fms. from shaft, during last month became twined and much poorer; its present size is 2 feet wide, and its worth 12 cwt. The stope in the back is 3 ft. wide, worth 21 cwt., and re-set at 53s. per fathom. The stope under the 40, 44 fms. east of shaft, is 1 ft. wide, and poor, worth about 4 cwt. We have reduced the men in this place to two.—Wagon Shaft—Middle Vein: The 93, 70 fms. east of shaft is driving mainly by the side of the lode, and continues to promise well for Little Limestone, over the above. We have resumed the stope in back of this level, 8 fms. west of shaft, where the vein is 3 ft. wide, and yields 9 cwt. of ore per fathom. This vein, east of shaft, where we are driving and stopping under the 70, 13 fms. from shaft, during last month became twined and much poorer; its present size is 2 feet wide, and its worth 12 cwt. The stope in the back is 3 ft. wide, worth 21 cwt., and re-set at 53s. per fathom. The stope under the 40, 44 fms. east of shaft, is 1 ft. wide, and poor, worth about 4 cwt. We have reduced the men in this place to two.—Wagon Shaft—Middle Vein: The 93, 70 fms. east of shaft is driving mainly by the side of the lode, and continues to promise well for Little Limestone, over the above. We have resumed the stope in back of this level, 8 fms. west of shaft, where the vein is 3 ft. wide, and yields 9 cwt. of ore per fathom. This vein, east of shaft, where we are driving and stopping under the 70, 13 fms. from shaft, during last month became twined and much poorer; its present size is 2 feet wide, and its worth

—“Coughs, colds, consumption, asthma, and bronchial affections are quickly and surely removed by them.” From Mr. Morris, 137, West Derby-road, Liverpool. They taste pleasantly. Sold by all druggists at 1s. 1½d. and 2s. 6d. per box.

to 44; the agent reports that as washing is progressing the gravel appears to be improving in quantity. The last clean-up is considered as indicating this, and when the full clean up is made the result is expected to show well. The Bald Mountain Gold-Washing Company, of Sierra county, California, have just washed up, and the result shows that their claim is one of the best in the State. The "upper yard" paid \$39,000—an average of about \$4 to the car-load—and fully \$5000 more they ever obtained from the same amount of gravel before. The "lower yard" contains three times as much of gravel as the upper one, and it is equally as good. From the clean-up the company paid all debts, and a balance of \$20,000 still remains in the treasury. Usually the Bald Mountain gravel averages \$3 to the car-load, but this year it is improving.

Hultfall, 5 to 5½; the latest reports from the mines are that the ends continue of the same value as when last reported upon, turning out large quantities of ore. The manufacturer of the dressing machinery which has been erected at the mines writes—"I have been two full days on the dressing-floors. The machinery has been erected in a very substantial manner, and it works to my entire satisfaction. Very great credit is due to the executive for the energy and skill in which so much work has been done, and under the circumstances cut large quantities of rich ore."

Lead Mines have been without animation, business having been necessarily restricted by the holidays, and the arrangement for the fortnightly settlement, which was commenced yesterday (Friday), Van, 19 to 21; the sinking of Seaham's shaft proceeds steadily, and is within a few feet of being deep enough for the 120 ft. level. The 105 west is still worth about 4½ tons of lead ore per cubic fathom, and the 90 west remains at the same value as last reported—14 tons per cubic fathom. On the whole, the mine is looking better.

Grogwinion, 3½ to 4; the mine looks well at all points. Another sampling of 150 tons is in preparation. Wye Valley, 1½ to 2½; the mine below the 22 is still going down in good ore. West Wye Valley are 2½ to 3½; these shares are a shade flatter on a few sales, but the mine continues to improve. Red Rock, 2 to 2½; a communication has been effected between the 60 and 72 ft. levels, thereby laying open a large extent of ore ground discovered more than a year since. Cron, 2½ to 2¾; these shares are a trifle firmer. The erection of the machinery is being proceeded with rapidly. South Cwmystwith, 3 to 4. Great Harmon, 2½ to 3½; the improvement reported last week continues, and are expected to lead to still further and more important discoveries. The first sampling—of 20 tons—will take place on Monday next, and should realise a fair price, as the parcel is dressed up to 81 per cent.

Pateley Bridge, 3 to 4; the Rake vein in the 30 east is worth 2 tons lead ore per fathom. The same level west is worth 1 ton per fathom, with indications of an early improvement. No change elsewhere. Smelting going on regularly. West Pateley Bridge, 2 to 2½; the Craven Cross vein in the winze sinking below the 56 ft. level is now 4 feet wide, and worth fully 20 cwt. of lead ore per fathom. The other points underground are without any change to notice. Dressing of lead is regularly carried on, and another parcel of ore will be ready for smelting very soon.

Subjoined are the closing quotations:—
Ashton, 3½ to 4½; Carn Brea, 4½ to 5½; Devon Great Consols, 2½ to 3; Dolcoath, 3 to 3½; East Caradon, 3½ to 4½; East Van, 5½ to 6½; Glenroy, 3½ to 4½; Great Laxey, 17 to 19; Hingston Down Consols, 3½ to 4½; Leadhills, 3½ to 4½; Marke Valley, 3½ to 4½; Pary's Mountain, 3½ to 4½; Pateley Bridge, 3 to 4; Penrith, 3½ to 4½; Roman Gravel, 7½ to 8½; Rookhope, 3½ to 4½; Tankerville, 4 to 4½; Tincroft, 10 to 12; Van, 19 to 21; West Ashton, 3½ to 4½; West Basset, 3½ to 4½; West Chiverton, 11 to 13; West Pateley, 2 to 2½; West Tankerville, 3½ to 4½; Wheel Gravel, 3½ to 4½; Almada, and Finto, 3½ to 4½; Argenteira, 3½ to 4½; Birdseye Creek, 3½ to 4½; Blue Tent, 3 to 3½; Cape Copper, 3½ to 4½; Cedar Creek, 3½ to 4½; Colorado Terrible, 1½ to 2; Chontales, 3½ to 4½; Don Pedro, 3½ to 4½; Eberhardt and Aurora, 5½ to 6½; Exchequer, 2½ to 3½; Flagstaff, 3½ to 4½; Frontino and Bolivia, 1½ to 2; Hultfall, 5 to 5½; J.A.L., 1½ to 2; 16th to 18th; Javali, 3½ to 4½; Kapanga, 3½ to 4½; Last Chance, 3½ to 4½; New Quebrada, 1½ to 2; Oregon Preference, 4 to 4½; Pestarena, 3½ to 4½; Pumas Eureka, 2½ to 3; Port Phillip, 7½ to 9½; Richmond Consolidated, 9½ to 10½; St. John del Rey, 3½ to 4½; Sierra Bates, 1½ to 2; South Aurora, 3½ to 4½; Tecoma, 1½ to 2½; United Mexican, 1½ to 2.

COLLIERIES.—Although in consequence of the holidays great slackness has prevailed in the various coal and iron centres, there are not wanting in some quarters signs of improvement and a better state of trade. South Wales, Staffordshire, and Yorkshire are doing especially well, and in both countries there are numbers of orders about, many of which it is believed will come to business; in fact, as prices can hardly go lower, it is not to be wondered at if customers do not hold back longer from supplying their requirements. A contemporary writes respecting Yorkshire:—"Taking the West Riding altogether, there has undoubtedly been a change for the better; more men are employed, and full work has been more general. The mills in both plates and sheets have been turning out larger quantities up to the holidays than for a considerable time previously, and from appearances there is every likelihood of this state of things continuing. Our colliery-owners now look forward to a marked improvement."

At Liverpool slightly better prices prevail, and there is also an improved demand. Experience would lead us to believe that trade is on the eve of a decided improvement, and shares in good and well selected coal and iron properties should, therefore, command attention. We hear the shares of the Ynysidwyn Company have been well taken up by iron and coal masters, and persons residing in the neighbourhood of the property. The collieries and ironworks are among the oldest established in the country, and have yielded enormous profits. About a quarter of a million has been spent upon them, and we think the present company has acquired them upon terms of most exceptional character. The quality of the iron and coal is known everywhere, and is such as to command the highest price in the market; in fact, the orders in hand show a profit of over 2s. per ton on the coal. The capital of the company is £60,000, and profits at the rate of 11,000. per annum are confidently anticipated and may be relied upon.

Chapel House shares have risen, and are now at 3½ to 3¾. There is every probability that they will rise still further before long. We extract the following from a broker's circular, having informed ourselves that the statements made are correct:—"A flaw has lately been discovered in one of the cylinders of the new engine making for the company, and a second has had to be made, thus necessitating some delay in the completion of the plant. Everything will be finished by the middle of June, and the meeting of shareholders will be held immediately afterwards. From thenceforward the raisings will be rapidly increased, until an output of at least 1000 tons per day be reached, when the present rate of profits being about 2s. per ton, the large sum which will represent the annual return to the shareholders of the company will be merely a matter of calculation. It is satisfactory to know that the company has a demand for considerably more coal than its present output, and there will be no difficulty to find a market for all that may be raised. The accounts from Oct. 1 to March 31 have been made up, and show that \$5,640 tons have been raised, at a profit of 3794, equal to about 2s. 8½d. per ton. The shares are rising, and are now at 3½ to 3¾. Altamont shares closed at 3½ to 4½; good progress continues to be made at this colliery, and a satisfactory quantity of coal is being raised and disposed of. Llay Hall, 7 to 10; Cardiff and Swansea, 3½ to 4½; New Sharlston, 3½ to 4½; Thorp's Gawber, 2½ to 3½; Newport Abercarn, 4 to 4½."

WEST PATLEY.—The various points of development continue to open out satisfactorily. The veins fully maintain former reported values. Each department is in vigorous working. Three new ponds have been made to store water for dressing purposes, and another is being made. Dressing of lead is being regularly carried on, and the manager hopes to have another parcel of ore ready for smelting very soon.

BLAEN CAELAN UNITED MINES.—We are informed that these properties continue to develop most satisfactorily. The splendid discovery in the 20, estimated as worth 50% per fathom, has so far proved itself to continue both in length and depth; in fact, to improve as they go down. Very little publicity has been drawn to this mine, as all the shares have been allotted, and there are none under offer on the open market; in fact, considering the small capital placed in the mine—24,000—it is fully expected that the shares will reach a considerable premium. The mine is being most judiciously managed, inasmuch as no attempt has been made to force sales of ore; on the contrary, the ground is being extensively laid open, and in a short time the reserves of ore in sight will not be over estimated at 10,000. Should these anticipations prove correct, and we have no reason to question them, an enormous impetus will be given to mining in the district, which until recently has been almost abandoned, although history tells us they were at one time amongst the richest in the United Kingdom.

DEATH OF MR. WILLIAM WATSON.—We deeply regret in having this week to announce the death of Mr. WILLIAM WATSON, which took place at his residence at Canonbury, on Easter Sunday, in his 53rd year. In early life he was in one of the largest foreign merchants' offices in Mark-lane. Afterwards he was for many years purser of some of the leading dividend and progressive mines in Cornwall and Devon, and we well remember the excellent manner in which he issued his reports and statements of accounts of the various mines under his charge. Latterly he had been in his brother's (Mr. Peter Watson's) establishment, at 54, Old Broad-street, and the able manner in which he has performed his several duties

will be deeply felt there, as well as by a large circle of relatives and friends.

FOREIGN MINING AND METALLURGY.

The Commentry and Fourchambault Forges and Foundries Company has just reported progress for 1877. The accounts presented by the directors were approved, and the dividend for the year fixed at 17.12s. per share. The extraction of coal effected by the company experienced a slight decline in 1877; on the other hand, the production of pig-iron, as well as of iron and steel, slightly increased last year as compared with 1876. The profits of 1877 declined, however, to 104,320l., as compared with 142,640l. in 1876. As regards the current condition of the French iron trade, it must be said to exhibit much depression except at Paris, where a good deal of activity certainly prevails. This activity is not due merely to the prosecution of the works required in connection with the Universal Exhibition about to be inaugurated; it is also the result of the prosperous condition of the building trade, and of the energy with which the various public works are being prosecuted. It is expected that on the third network of railways about to be carried out in France locomotives of considerably reduced dimensions will be employed; the permanent way will also be probably of a lighter description. The Mokta-el-Hadid Magnetic Iron Minerals Company will pay on May 1 the balance of its dividend for 1877, or 17.12s. per share.

The consumption of coal remains comparatively feeble in France; prices are not like stocks—they do not increase. The sittings of the Departmental General Councils are awaited with some interest in consequence of circulars from M. de Freycinet calling for information upon various questions relating to railways of local interest, as well as tramways. These matters, of course, concern the French coal and iron trades.

The Belgian coal trade exhibits little animation. Deliveries are sluggish, and transactions restricted. The metallurgical interest maintains an attitude of much reserve, ordering coal only to meet its immediate requirements, which for the rest are not very considerable. The Council of Administration of the Association of Engineers Educated at the Liège School has fixed the date of the annual meeting for July 28—a week earlier than had been originally arranged. The same Association is arranging for the organisation at the Paris Exhibition of a consultation office. The office would not only be available for consultation purposes but it would also, it is believed, be useful for the collection and circulation of precise information with reference to objects exhibited.

The Belgian iron trade has been largely occupied during the last few days in completing its preparations for the Universal Exhibition at Paris. The Rodange Blast-Furnaces Company (Grand Duchy of Luxembourg) has decided on lighting one of its blast-furnaces towards the close of next month. M. Jochams, Chief Inspector of Mines in Belgium, has made public some statistics collected in illustration of the position of the iron and steel trade in Belgium in 1876. Seeing that we are now well into 1878 these statistics come rather late in the day, nevertheless it may be well to summarise them. The whole number of ironworks in Belgium in 1876 is returned at 324, the number of men employed at 21,623, the production of pig at 571,267 tons, and the production of rough iron at 415,714 tons. The number of steelworks in Belgium in 1876 was 3, the number of workmen employed in these establishments was 1564, and the production was 75,258 tons. The value of the pig-iron made in Belgium in 1876 was 1,956,252l.; of the rough iron, 3,084,200l.; and of the steel, 625,651l. The quantity of iron minerals produced in Belgium in 1876 was 269,206 tons, of the value of 98,319l. More than half the iron made in Belgium in 1876 was from the Hainaut district.

THE CHEMISTRY OF THE SUN.—After an absence of several years Prof. Pepper has resumed his position as a lecturer at the Royal Polytechnic Institution, and from the hearty reception he had on his return it is evident that his ability to combine instruction with amusement is not forgotten, and that his popularity has not in any degree diminished. His new lecture "On the Chemistry of the Sun" is a most attractive one, and his imitation of the phenomena seen during a total eclipse of the sun by the aid of the large glass screens used in producing the "ghost effects" is extremely ingenious.

NORTH WALES.
CORNWALL.
SHROPSHIRE.
DURHAM.
LANARKSHIRE.
TURKEY (EUROPE).
STRAITS OF MALACCA.

SOUTH WALES.
DEVON.
LINCOLN.
NORTHUMBERLAND.
FRANCE.
TURKEY (ASIA).
JAVA, &c.

A PRACTICAL MINE INSPECTOR, who has Surveyed and Reported on Mines in the above places, is prepared to REPORT on MINERAL PROPERTY.

Address, "Miner," Rock and Co., 45, Leadenhall-street, London.

WATER-WHEELS.

WANTED TO PURCHASE TWO WHEELS, each 40 ft. diameter, by 8 ft. breast. Must be of best make, and in good condition. PUMPING RODS and JOINT PINS also required. Send prices, and full particulars, to "Copper Mine," care of J. W. Vickers, 5, Nicholas-lane, London, E.C.

THE ADVERTISER has just secured a VERY VALUABLE SILVER-LEAD SETT, in which there are several rich lodes and thousands of tons of halvans that will pay 100 per cent. over working cost. Wants a gentleman to form a company or advance money to open and lay out the works. The amount will be small. Particulars from "Miner," MINING JOURNAL Office, 26, Fleet-street, London.

TO ROCK-DRILL CONTRACTORS.

THE PROPRIETORS of the WEST ESGAR LLE LEAD MINE (situated 12 miles from Aberystwyth) invite communications from Proprietors of Rock-Boring Machinery who would be prepared to UNDERTAKE TO DRIVE FIFTY or ONE HUNDRED FATHOMS of LEVELS at a fixed price per fathom. Apply to ALFRED E. WENHAM, 50, Ann-street, Birmingham.

THE CHINA CLAY TRADE.

THE ADVERTISER, who is engaged in the Management of China Clay Works, has exceptional opportunities for the EMPLOYMENT of CAPITAL in this IMPORTANT and PROFITABLE INDUSTRY. Owing to the temporary depression in trade, there are now opportunities for investment which may not occur again for years, and handsome profits are certain. Address, "C. E.," MINING JOURNAL Office, 26, Fleet-street, London.

RE-ENGAGEMENT REQUIRED by a MINING CAPTAIN.—Do not object to go abroad. Twenty years' experience in the management of Tin, Copper, Lead, and Silver Mines in Cornwall, Wales, and Portugal. Good references and testimonials. Address, "N. E.," Post Office, Liskeard, Cornwall.

SLATE QUARRY FOR SALE.—The right of working the same extends over a surface of two millions square metres. It produces roofing slates of first-rate quality, as well as slate slabs suited for industrial purposes. Offers to be addressed sub "S. P. 1004," care of G. L. Daube and Co.'s Advertising Office, in Frankfurt-on-the-Maine, Germany.

THE EGLWYSEG EXTENSION SILVER-LEAD MINE, west side of Miera Mountain, TO BE SOLD. Apply to Mr. J. YER, Amble, North Wales; or Mr. CRAVEN, Buckley, Chester; or to Mr. W. H. RICHARDS, Mellor's Buildings, Exchange-street East, Liverpool.

ST. BRIDE'S SLATE QUARRY, PEMBROKESHIRE. FIFTY SHARES, fully paid, FOR SALE in this DIVIDEND-PAYING PROPERTY. Address, "X. O.," MINING JOURNAL Office, 26, Fleet-street, London.

MR. WILLIAM SALMON, F.G.S., 22, QUEEN STREET, ULVERSTON, MINING AND COMMISSION AGENT AND ACCOUNTANT. SEVERAL VALUABLE IRON ORE, SLATE and LEAD ROYALTIES, TO DISPOSE OF.

MR. W. F. STANLEY, MATHEMATICAL INSTRUMENT MANUFACTURER TO H.M.'S GOVERNMENT, COUNCIL OF INDIA SCIENCE AND ART DEPARTMENT, ADMIRALTY, &c. MATHEMATICAL, DRAWING, and SURVEYING INSTRUMENTS of every description, of the highest quality and finish, at the most moderate prices. Price-list post free. ENGINE DIVISION TO THE TRADE. ADDRESS—GREAT TURNSTILE, HOLBORN, LONDON, W.C.

ZINC ORES.

ARMAND FALLIZE, INGENIEUR-CIVIL, A LIEGE (BELGIUM), BUYER.
1.—CARBONATED AND OXYDED ZINC ORES (CALAMINE, &c.)
2.—ZINC AND LEAD ORES MIXED TOGETHER, BUT DRESSABLE KINDS ONLY

CAPPER PASS AND SON, BRISTOL

PURCHASERS OF
LEAD ASHES, LEAD SLAGS, SULPHATE OF LEAD, HARD LEAD, BRASS SLAGS AND ASHES, COPPER REGULUS, MATTE, SCORIA, TIN ASHES, TERNE ASHES, &c., and MIXED ORES or REFUSE, containing LEAD, COPPER, TIN, or ANTIMONY.

WALTER ROY AND ALLAN, 184, BUCHANAN STREET, GLASGOW, EXECUTE COMMISSIONS FOR THE PURCHASE AND SALE OF SCOTCH PIG-IRON WARRANTS.

Sole Agents in Scotland for—
SPEAR AND JACKSON, Etna Steel Works, Sheffield; and
JOHN SHAW, Yorkshire Wire Rope Works, Sheffield.
Steel and Steel Tools, Pig and Manufactured Iron, Hemp and Wire Ropes for all purposes, India-rubber Goods, and Furnishings of every description for Collieries, Foundries, Engineers, Saw-mills, &c.

ASBESTOS.

THE BEST MATERIAL for the STEAM JOINTS of LOCOMOTIVES, MARINE and STATIONARY ENGINES BOILERS, &c.

It is manufactured entirely pure, and of the best and strongest qualities, into MILLBOARD, for STEAM, WATER, GAS, and ACID JOINTS.

Further particulars and prices of the undersigned,

SMITH, FLEMING, AND CO.,

17 AND 18, LEADENHALL STREET LONDON, E.C.

MINERALS WANTED.

ADVERTISER requires REGULAR CONSIGNMENTS of GOOD SULPHUR ORE (PYRITES), either cupreous or non-cupreous; also, GOOD BLENDE, and SOFT MANGANESE ORE. Address, "Pyrites," MINING JOURNAL Office, 26, Fleet-street, London, E.C.

MR. HENRY SEWELL, MINING ENGINEER AND METALLURGIST.

Twenty-three years' practical experience in Chile, Peru, Mexico, Germany, Hungary, Spain, Sicily, England—five years in Utah, Nevada, and California. SPECIALITIES.—COPPER MINING: The Smelting of Copper and Argentiferous Copper Ores, with wood fuel or coal in reverberatory furnaces, into matte of 70 per cent., the silver increasing five times. Ten years' practical experience in Chile.—The Reduction of Native Sulphur Ores, as practiced in Sicily, without fuel or iron pans. Six years' practical experience in Spain. Mining Agent for the Chilean Government on this coast.

330, PINE STREET, SAN FRANCISCO (ROOM 4).

MINES OF EVERY DESCRIPTION, AT HOME AND ABROAD, CAREFULLY INSPECTED AND VALUED. Address, MARSHALL and Co., St. Antholin's Chambers, 26, Budge-row, Cannon-street, London, E.C.

MR. TIMOTHY HUGHES, MINING AGENT AND SHAREDEALER.

59, SEEL STREET, LIVERPOOL. Reliable information given respecting Welsh and Manx Mines.

PRINCE PATRICK MINE.

New Issue of 12,000 Preference Shares. T. H. strongly recommends his friends and the public to secure an interest at once in this very valuable mine while the shares can be obtained under such favourable circumstances. See report in Supplement to Mining Journal, March 9th, also advertisement in Journal of March 16th.

THE "INVESTORS' GAZETTE."

Published EVERY FRIDAY EVENING. Post free for 3 months, 2s. 6d. The "INVESTORS' GAZETTE" contains a resume, as brief and concise as possible, of the prices on the Stock Exchange and Mining Market for the week, and latest intelligence from Mines in all parts of the world. The "INVESTORS' GAZETTE" gives the lowest net prices at which MINING and OTHER SHARES can be purchased.

Edited and published by—
ALFRED E. COOKE, 74, OLD BROAD STREET, LONDON

LEAD ORES.

Date.	Mines.	Tons.	Price per ton.	Purchasers.
April 23—	Foxdale	105	£18 5 6	Weston, Son, and Co.
25—	Roman Gravel	20	10 12 0	Nevill, Drue, and Co.
—	ditto	50	10 12 0	Fanther Land Company.
—	ditto	50	10 15 6	George Barr.
—	ditto	50	10 12 6	ditto
—	Ladywell	25	9 5 0	ditto
—	Tankerville	100	10 16 6	ditto
—	West Tankerville	25	10 12 6	ditto
—	North Laxey	20	11 12 6	Walker, Parker, & Co.
—	Great Dyllife	50	10 10 0	Panther Lead Company.

COPPER ORES.

Sampled April 3, and sold at Royal Hotel, Truro, April 18.					
Mines.	Tons.	Price.	Mines.	Tons.	Price.
Devon Great Consols	90	£19 0 0	Glasgow Caradon	65	£4 11 0
ditto	89	1 9 6	ditto	64	3 16 6
ditto	87	1 9 6	ditto	61	4 11 0
ditto	77	1 8 6	ditto	35	5 0 0
ditto	73	1 9 6	Hingston Down	74	2 13 6
ditto	72	1 15 0	ditto	60	2 7 6
ditto	70	1 10 6	ditto	49	2 1 6
ditto	68	4 11 6	Levant	63	8 4 0
ditto	61	4 11 6	ditto	58	7 9 6
ditto	53	4 9 0	ditto	53	5 7 6
ditto	49	3 4 0	ditto	2	33 16 6
ditto	35	3 16 0	Wheal Crebor	64	2 15 6
ditto	26	1 13 6	ditto	75	2 15 6
South Caradon	85	3 2 6	Gawton	68	2 6 0
ditto	68	4 3 6	ditto	49	1 14 6
ditto	64	2 5 0	ditto	23	0 13 0
ditto	62	2 1 6	Bedford United	65	2 14 6
ditto	54	4 11 6	ditto	58	2 17 0
ditto	51	9 9 0	West Maria & Fortescue	62	1 3 0
ditto	49	9 8 0	ditto	23	3 11 0
ditto	47	4 14 6	Phoenix	50	4 19 6
Marke Valley	100	2 14 6	Belstone	21	5 9 0
ditto	80	2 8 6	Wheal Owles	12	17 0 0
ditto	57	3 7 6	ditto	8	35 16 0
ditto	53	2 15 0	ditto	2	25 16 0
ditto	30	1 1 0	Prince of Wales	14	0 12 0

Devon Great Con. 845 £1779 5 6
South Caradon ... 480 3233 17 0
Marke Valley ... 320 845 8 0
Glasgow Caradon ... 225 993 2 0
Hingston Down ... 173 418 7 6
Levant ... 163 1237 16 6
Wheal Crebor ... 159 441 4 6

Average standard £ 87 9 0
Average price per ton £ 87 9 0
Quantity of ore 2836
Amount of money £9655 9 0
LAST SALE.—Average standard £ 84 0 0
Standard of corresponding sale last month, £ 93 4 0—Produce, 6½

COMPANIES BY WHOM THE ORES WERE PURCHASED.			
Names.	Tons.	Amount.	
Vivian and Sons	684½	£2924	2 6
Grenfell and Sons	332½	1214	8 0
Nevill, Drue, and Co.	4 7½	987	7 0
Williams, Foster, and Co.	785½	8298	8 9
Mason and Elkington	318	887	7 0
Charles Lambert and Co.	305	973	8 0
Total	2836	£9655	9 0

Copper ores for sale at the Tabb's Hotel, Truro, on Thursday next—Mines and parcels.—Mellancar 540—West Wheal Tolgus 300—East Pool 262—West Wheal Scton 304—South Wheal Crofty 137—Kilbreth 77—Botallack 69—Carn Brea 48—North Bury 32—Wheal Comfort 120—West Rooker 17—Wheal Union Wood 3—Total (21 cwt.), 1653 tons.

Notices to Correspondents.

* Much inconvenience having arisen in consequence of several of the Numbers during the past year being out of print, we recommend that the Journal should be filed on receipt; it then forms an accumulating useful work of reference.

SIR.—Would some reader kindly state what is the value of white lead ore before being crushed, and what is the expense of crushing per ton?—F. G. S.

NEW ZEALAND KAPANGA.—Your correspondent "X. Y. Z." in last week's Journal, referred to a subject which is at present exercising the minds of a great many others. What is to be the fate of the New Zealand Kapanga? Are its formerly reported bright prospects only clouded or discovered to be non-existent? Why have there been no reports published of late? Have the Chairman and directors not sufficient energy to raise the small sum which they say is only requisite to make the mine a success, or is there manipulation for the benefit of the few? Candour begets friends and assistance, secrecy begets suspicion.—G. B.

WET COPPER PROCESS.—If "F. H. N." will apply to Thomas Tonkin, mining engineer, Oola, near Tipperary, who has recently returned from Spain, and who is one of the patentees of an improved copper extraction process in that country, he can obtain the desired information.—T. T.

GREAT WHEEL RODD.—It was considered at the board meeting that no further reply to "B. C." was needed, as the typographical error had been noticed in last week's Journal.—W. D. MANN, Secretary: Torquay, April 24.

WHEAL NEWTON.—I waited until this week to see the correction of an error in Capt. Bennett's report, published in the Journal of April 13, which if not corrected might not only tend to mislead the shareholders but the public too. I imagine it might be the printer's mistake—instead of 4 tons 1 cwt. 30 lbs. of silver ore, worth 8210 oza. per ton, which at 4s. per ounce would be worth 6917l. 14s., the fact is it was only 4 cwt. 1 qr. 20 lbs., worth 8210 oza. per ton, which at 4s. per ounce would be only 364l. 10s., making a difference in money value of 6553l. 4s., which is a considerable sum, but, perhaps, the uncorrected error might suit the interest of the company best.—VIGILANCE: Callington, April 24.

Received.—"F. V." (Hamilton, Nevada)—"A. S." (Christiana)—"Highland" (Arizona)—"W. T. E." (Derby)—"Shareholder" (West Seton) objects to the declaration of the dividend, and disapproves altogether of Mr. Hale's "dictatorial proceedings."—"Shareholder" (Kossa Grande)—"C. H. A."—G. T.—"Shareholder" (Wheal Gribor)—"Subscriber" (Morla-du)—"W. G."—"Tempus Fugit" (Richmond): The letter from the Secretary renders the publication of his letter unnecessary—"T. E. O." (Gunnislake)—"W. B. P." (Bristol): Next week—"T." (Kington Consols): See letter from Capt. Hancock, in another column—"Visitor" (Old Treburget)—"Hail! Columbia" (Flagstaff).

THE MINING JOURNAL.

Railway and Commercial Gazette.

LONDON, APRIL 27, 1878.

THE PRICE OF COAL IN LONDON.

At the time when the collieries in all parts of the kingdom are working little more than half time, it is surprising to find the price of coal at this season of the year so high as it is, for it is even higher than it was a month ago. To the uninitiated the colliery owners are supposed to be the gainers by this state of things; but such is not the case, for many of them are now selling lower than they did a month ago. We are, therefore, glad to find that Mr. T. W. BUNNING, as secretary of the North of England United Coal Trade Association, has publicly drawn attention to the matter. He states that the metropolitan retailers charge from 10s. to 11s. per ton for sea-borne coal over and above the price paid at the ship's side in the Thames. Quoting the price of the last market at 17s. 6d. per ton as the price for Lambtons as for best Wallsends, he explains that certain allowances are made which reduce the price actually paid by the coal merchants to 16s. 2d. per ton, and accuses them of taxing the public far too heavily. He considers that the price from the ship's side to the consumers' cellar should not exceed 8s., and never 9s. a ton; consequently 26s. a ton, the present price, is therefore by far too high a quotation, looking at the charges made to the merchants. Mr. BUNNING does not by any means overstate the matter, but to our thinking allows the merchants too large a margin, and this we are able to show from the sworn statement of the principal merchant in the Metropolis.

In the evidence given before the Select Committee on Coal in 1873, Mr. SYDNEY COCKERELL was examined. The answer to Sir GEORGE ELLIOT (Question 7208) is as follows:—"Now, as I understand, when you paid 18s. the price for transport from the Pool to the coal cellar was 5s. It would be more than that; it would be nearer 6s.; it is a varying estimate, so much depends upon the cost of provender, horses, and rent." This was 30 per cent. of the entire working cost, including all the working expenses and transport to London, colliery owners' profit, and everything else. Further on Mr. COCKERELL said that whilst 6s. was the cost from the Pool to the coal cellar, the average cost from the railway to the consumer was from 4s. 6d. to 4s. 8d. per ton. Now, as the present price of coal in the Pool (the highest) is only 17s. 6d., then the charge according to Mr. COCKERELL ought only to be 23s. 6d. per ton instead of 26s. But as Mr. BUNNING informs us that the actual price is only about 16s. 2d., then the charge to the consumer should only be 22s. 2d., or (say) for the sake of even numbers, 22s. 6d. But the charge appears to be 9s. 10d. per ton, or more than 50 per cent. on what the colliery receives for the coal and conveying it to London. Here there appears to be a vast and unconscionable profit which nothing can really justify—this, too, at a time when trade is in such a depressed state, and wages low. The only way that this state of things can be counteracted is by colliery owners combining together and becoming merchants, instead of allowing all the profits to be pocketed by middlemen, whilst the odium goes to the producer.

RAILS IN THE UNITED STATES.

The history of American rails for the last six years is virtually the history of American railways, since as from 1872 American rails have dominated the American markets, and English rails have been practically excluded from them. After the close of the American War in 1865 the American railroad interest experienced a gradual revival of activity. This activity increased more and more in 1867, 1868, and 1869; and although in those years large quantities of English rails were imported into the United States, still the demand for American rails also expanded more and more. In 1867 the production of American rails was 462,108 tons, in 1868 506,714 tons, and in 1869 593,586 tons. Rapid as was the advance in the production in 1867, 1868, and 1869, it was destined to be still further stimulated and accelerated in the three succeeding years, the production being carried in 1870 to 620,000 tons, in 1871 to 775,733 tons, and in 1872 to 1,000,000 tons. The capital required for the prodigious, premature, and in some cases, it is to be feared, corrupt development of American railroads between 1868 and 1872 was obtained to a considerable extent from Europe; and every year the projects which were brought forward for the consideration and victimisation of European dupes became more and more wild and worthless. At last the bubble of inflation burst, and the day of reckoning came. The collapse of the Northern Pacific Railroad scheme was the signal for general alarm, and the era of disappointment and default commenced in 1874. In 1875, 1876, and 1877 there cannot be said to have been much improvement; indeed, matters have gone, on the contrary, from bad to worse; and although English rails have been gradually driven by low prices and prohibitive import duties from American markets, the demand for American rails has sensibly fallen off since 1872. In that year, as we have already shown, the production of American rails was estimated at 1,000,000 tons; in 1873 there was, however, a sharp decline to 890,077 tons, and in 1874 the production further receded to 729,413 tons. In 1875 it rallied to 792,512 tons, and in 1876 it increased still more to 879,629 tons. Last year appears, however, to have been a period of renewed exhaustion, and the manufacture receded to 764,709 tons. In spite of the policy of "protection to native industry" which finds such favour in the American Congress, 1877 can scarcely be said to have been a prosperous year for the American iron trade. Foreign competition may have been dealt with after a fashion, but still the demand for American rails was unmistakably weak during the last 12 months. There was but little life in American railroads in 1877, and there was in consequence but little life in the American iron trade.

The American iron trade, in common with the English iron trade,

has experienced great vicissitudes since 1868, steel having largely displaced iron. This will be seen by the annexed table, showing the production of iron and steel rails in the United States in the decade ending with 1877 inclusive:—

Year.	Iron rails.	Steel rails.
1868.....	499,489	7,225
1869.....	583,938	9,650
1870.....	586,000	34,000
1871.....	737,483	38,250
1872.....	906,930	94,070
1873.....	761,062	129,015
1874.....	684,469	144,944
1875.....	501,949	299,863
1876.....	467,168	412,461
1877.....	382,640	432,169

Thus, not even the prolonged season of depression through which the United States have passed since the JAY COOKE panic has been able to arrest the American production of steel rails. The great American railroad companies have steadily adhered to a policy of substituting steel rails for iron ones in the renewal of their permanent way; and the result has been that the demand for American steel rails has been ever growing. It may be interesting to add that of the rails produced in the United States in 1877, 45½ per cent. were made in Pennsylvania, 15½ per cent. in Illinois, and 10½ per cent. in Ohio.

THE MINERAL RESOURCES OF BRITISH COLUMBIA.

The fourth annual report of the mineral resources of the province of British Columbia, for a copy of which we are indebted to the Honorable the Minister of Mines—Mr. A. C. Elliott—is a highly encouraging one. It appears that the amount of gold actually exported by the banks during 1877 was 1,206,136l., to which one-third must be added for gold exported in private hands 402,046l., making a total of 1,608,183l. The total yield for 1876 was estimated by the Gold Commissioners and Government Agents at 980,671l., but the banks alone exported more than 3350,000 over that amount, and a large sum must be added for gold exported otherwise than through the banks. For the second time in the history of British Columbia the old mining district of Cariboo stands prominently forward. Ever since 1863 companies have from time to time been formed, and large sums expended, in the endeavour to find gold quartz in paying quantities. Unfortunately the necessary technical knowledge was wanting, and failure the result. In May last the Provincial Government—in addition to having offered a bonus, under certain conditions, to the company which should first erect a 10-stamp quartz mill in Cariboo—wrote to Mr. Brooker, Her Majesty's Consul at San Francisco, asking him if he would kindly employ, on its behalf, the services of some person skilled in quartz. The province was indeed fortunate in Mr. Brooker's selection, for Mr. Harper's great knowledge and experience in lodes and ores are undoubted, and have been of the greatest possible use in the so far successful developments which have been made during the past season. A year ago the miners of Cariboo, after long and patient struggling, had nearly given up all hope; to-day everybody is looking forward to an era of prosperity which, in the opinion of the well-informed, will even exceed that of the palmy days of 1862-3-4-5. Confidence and activity have been substituted for despondency and apathy, and even at this season of the year, with many feet of snow on the mountains, men are out in all directions prospecting for ledges. The yield of gold from the alluvial claims in Cariboo has doubtless fallen off; it is probable, however, that such has not been the case to the extent estimated by the Government agent. It is greatly to be regretted that the Victoria Company, on Cunningham Creek, have been obliged to abandon their ground.

The Government agent at the Forks of Quesnelle, acting for the Keithley Creek section of the Cariboo district, has naturally but little to report upon which could be considered of much interest to the general public. It is satisfactory, however, to observe that Keithley Creek (discovered in 1861) still continues to yield gold in paying quantities. The great bulk of the mining population in this section is composed of Chinese, from whom it is impossible to obtain returns even approximately accurate. It should be mentioned that even in Cariboo the Chinese appear to be contributing much more largely to the development of the wealth of the province than the whites, the industrial population consisting of 471 whites and 753 Chinese. Of these numbers the whites are engaged, 333 in mining, 45 in trading, and 93 otherwise; and the Chinese are engaged, 598 in mining, 44 in trading, and 111 otherwise. The great drawback appears to be that the Chinese have brought no women with them, the female population being represented by 50 whites and only 29 Chinese. The gold yield of the Cassiar mining district slightly declined during the past year, but the season was a most unfavourable one for mining, and the report of the Gold Commissioner may on the whole be considered encouraging. McDame Creek has not sustained the high opinion formerly held of it by miners. Its first north fork, however, is apparently rich, the pay-dirt in one tunnel having yielded 136 ozs. to five sets of timbers, and prospects found in other tunnels are equally indicative of rich ground. The discovery by Mr. WALKER of a new creek on a different range is most important; it will, in all probability, open up a new mining district. The prospect obtained—60 ozs. for 48 days' work—is really a good one, and it would appear that paying ground extends for at least 2½ miles. The gold being obtained in a different range from that in which previous discoveries have been made, is a fact of much significance to the practical miner. It is hoped and expected with confidence that the approaching mining season will be a more prosperous one than the last. The efforts made by miners to discover new diggings at Kootenay have not hitherto been crowned with success, but it is hoped that the coming season will give better reward. The estimated yield from the Okanagan section of the Province is the same as last year. Prospecting on Cherry Creek does not appear to have been attended with much success, but Mr. DUTKAU, late in the season, obtained a satisfactory prospect in the hill, and the discovery may lead to important results. Prospects have also been obtained on a small tributary of this creek, but no sufficient test has yet been made to justify any opinion concerning it. The find of gold on the head waters of the Kettle river is probably the most important discovery yet made in this district. It must be remembered, however, that but little prospecting has yet been done. Mr. Dawson, of the Dominion Geological Survey (whose opinion is valuable), examined the Cherry Creek section last summer, and considered it to be rich both in gold and silver. It is scarcely necessary to dilate on the very great advantages which would accrue to the Province from the discovery of even a fairly paying mining camp in this one of the most important farming and stock-raising districts of British Columbia—the miners would have cheap food and the farmers a ready market. As to Kamloops, a few Chinamen continue to work on Tranquille river, but the Government agent is unable to report any new discoveries of paying ground.

With regard to coal, the report is highly satisfactory. Notwithstanding the continued depression of the coal market in San Francisco the total output for 1877 exceeded that for the preceding year by nearly 15,000 tons. The total yield was 154,052 tons in 1877, against 139,191 tons in 1876. The Nanaimo Collieries include the Douglas, Chase River, and Fitzwilliam pits, and are worked with a plant of the value of \$123,000, and produced 94,810 tons in the year. The Douglas Mine, Nanaimo, is worked by slope; there are six levels, three of which are in operation, the coal in the lowest is about 5½ ft. to 6 ft. thick. The product of this mine is first-class gas making purposes. The old Douglas pit is now used as an up-cast shaft. New Douglas Mine is situated near Chase River, about 1½ mile from the old Douglas pit. The mine is being opened up by slope with three north and south levels. The thickness of the seam extends from 4½ ft. to 9 ft. of very clean coal, which is known as New Douglas, or Chase River coal, and is held in the highest estimation in the foreign and domestic markets for steam and household purposes. The capacity is now upwards of 280 tons, which will be doubled on completion of the powerful hoisting and pumping engine in course of erection. Fitzwilliam Mine, on Newcastle Island, is worked by slope of 800 yards. The coal produced is of a first-class quality for steam and household use. Newcastle Mine, not in operation, 240 yards by slope, on Newcastle Island. Chase River Mine, 290 ft. deep by shaft; not in operation. The railway is a little more than

two miles in length, constructed of heavy double headed steel rails, 52 lbs. to the yard, laid on chairs, bolted to wooden ties. The railway extends from the New Douglas Mine to the company's loading pier, with branches and sidings to the Douglas Pit, &c. The company have 50 5½-ton coal cars and 50 3½-ton, and three powerful locomotives. There are facilities at the company's wharves for delivering 1500 tons of coal per day. The Wellington Collieries are worked by one slope with \$140,000 worth of plant. There is one seam 8 ft. to 10 ft. thick, and two 3 ft. seams; they have 3½ miles of railway, three locomotives, over 100 wagons, three engines, two steam-pumps, &c., and produced 48,743½ tons of coal in 1877. The miners were on strike for four months. The Harewood Colliery has one workable seam from 3 ft. to 9 ft. wide, water level, air level, and drawing level, and 2½ miles aerial tramway. The value of plant, if any, is not stated. The output was 9000 tons in the year. At Baynes Sound Colliery they have two seams worked with \$67,000 worth of plant. They have one 7-ft. seam, one 4 ft. 6 in. seam, and about six tunnels, they have 3½ miles of railway, a Baldwin 8-ton locomotive, and about 25 cars. The output in 1877 was 1500 tons. The Nanaimo Collieries employ 428 hands; the Wellington, 232; and the Harewood 83 hands. The wages paid differ very little at the several collieries, being \$2 to \$4 per day for whites, \$1 to \$1½ for Chinese, and about \$1 more for Indians.

The report to the Minister of Mines upon copper received from Mr. HARPER, the Government Mining Engineer, after a personal inspection of the Howe Sound Copper and Silver Mine, is wonderfully encouraging. Mr. HARPER not only pronounces the lode to be a true fissure vein but states that it is the richest ore of its character which he has ever seen on this coast or in England. Mr. HARPER's belief that the country between Howe Sound and Jervis Inlet will in time become a great mining district is well worthy of attentive consideration. Mr. HARPER states that in consequence of a considerable depth of snow on the summit of the mountain where the mine is situated he was not able to follow the lode continuously for any great distance, but on the south-east side there was about 300 ft. of the lode exposed. He examined it and found it about 2½ ft. wide, running nearly east and west. The lode, a true fissure vein, has a perpendicular footwall. There are stringers further south which at a lower level will run into the lode. The ore is of a rich character, made up of peacock and grey ore, and oxide of copper; it carries also a large percentage of silver. It is the richest ore of this character he has ever seen on this coast or in England. The formation is granite. In Cornwall (England) the richest copper mines are in granite. In Nevada the richest silver mines, with the exception of the Comstock, are in granite. He firmly believes that the lode will at a greater depth from the surface prove to be richer in silver than in copper. He can with confidence recommend it to mining capitalists. There is no road to the mine, which is in consequence at present difficult of access. He would recommend that a competent person be sent to examine the country between the mine and the salt water with a view to laying out a road in the most eligible location. Not only may the mine be made particularly reference to be thus opened but the ground on the east and west may be worked also.

CHILEAN COPPER MILLIONAIRES.—Mr. HENRY SEWELL, M.E., writes—Lately we heard through the press of the death of a Chilean millionaire, Don Augustin Edwards, who leaves a fortune of \$25,000,000, having held the monopoly of copper for years. Don Jose Thomas Urmeneta has a fortune of about \$16,000,000, acquired through his copper mines in the district of Tamaya, province of Coquimbo, where he has splendid smelting works and about 40 furnaces. Mr. Charles Lambert, another copper millionaire arrived in Chile in 1830 a poor man. He died last year leaving \$5,000,000 in hard cash, besides his mines and smelting works in Chile and Swansea; these being but a few of the many successful operators in the copper mines of that country that might be mentioned. By way of illustrating the richness of the ores there I give you the following facts touching the production of the Rosario Mine, in the district of Tamaya, Coquimbo, for nine years—reaching from 1866 to 1875, inclusive. The average percentage of metal contained in the ore during this time was 19; tons raised, 64,000; value, \$4,393,128, or in round numbers, \$50,000. When I was in this mine in August, 1876, the production for that month was 940 tons, average assay, 21 per cent. Mr. Urmeneta's mine, close to this and on the same vein, has produced three times the above amount—180,000 tons, of an average of 31 per cent., during 15 years. I could give you a great many more examples of like purport were it necessary. From a practical experience of 10 years in copper mining and smelting in Chile, I can safely assert that if capitalists paid more attention to this branch of mining they would be amply rewarded for their outlay.

MINING IN ARIZONA.—Mr. Henry Sewell, M.E., has been engaged to report on the McMillan Mine, in Arizona, a mine that is shipping \$20,000 ore to the ton, and the richest mine in the world after those of Chile. We expect that we shall be favoured with a report from Mr. Sewell of the inspection of this wonderful mine.

MINERAL WEALTH OF THE LAND OF MIDIAN.—An interesting announcement reaches us from Cairo. The famous explorer Capt. Burton, commanding the Khedival Expedition for the survey of mines in the land of Midian, has returned to Cairo. He travelled 500 miles by land, and brings back 25 tons of specimen ore, comprising gold, silver, copper, tin, and lead. Capt. Burton found three sulphur centres, three turquoise mines, extensive deposits of gypsum, saltpetre, and rock salt. He comes to England in order to arrange as to working the mines for the Khedive. Simultaneously with this report occurs the publication of Capt. Burton's book "The Gold Mines of Midian, and Ruined Arabian Cities," in which a wonderful account is given of the results of his explorations last year.

GREAT ESCAPE OF GAS FROM A COAL BORE.—A workman in the employment of the Gartness Coal Company heard a loud hissing sound proceeding from a bore recently put down in the neighbourhood of the extensive works at Gartness. On receiving information the manager at once proceeded to the spot, and after inserting a pipe set fire to the waste, which at once blazed out most furiously. This gas continued burning for some time, when the manager carried the gas close to the engine boilers by means of a 2-in. pipe, so that if there is any likelihood of the pressure continuing long the gas may be utilised for heating the boilers and raising steam. At present the country for a great distance around is nightly brilliantly illuminated with the great escape of gas.

CHEAP GAS FOR HOMES AND MANUFACTORIES.—Almost endless discussion has been published in the *Mining Journal* upon the manufacture and use of water gas, but hitherto nothing approaching commercial success has been obtained. In a paper on the subject, read before the Society of Arts by Mr. S. W. DAVIES, A.R.S.M., it was stated that numerous attempts have been made by previous workers in this direction to produce a cheap gas for heating purposes by the action of water vapour on incandescent carbon. It has long been known that if steam be passed over coke or charcoal heated to redness a decomposition of the steam takes place, hydrogen, carbonic oxide, carbonic anhydride, and a small proportion of marsh gas being produced. The object of Mr. Davies's paper was to describe a modification of Kidd's patent. The apparatus used is small, compact, by no means costly, and combines a gas generator, boiler, and superheater in one; it generates its own blast, is continuous in its action, and so easily worked that a person of average intelligence may be taught to attend to it in a few hours. In the discussion which followed he stated that the cost of this gas was about 5s. 3d. for 10,000 ft. in the small generator, but when a larger generator was used 7s. 10d. for 35,000 feet, or about 3d. per 1000 cubic feet. Owing to the large percentage of nitrogen the gas was very little explosive—in fact, he had found it difficult to explode it when mixed with pure oxygen by passing an electric spark through it. Sir Francis Knowles, Bart., F.R.S., offered Mr. Davies his condolence on the large quantity of nitrogen present, which must considerably reduce the temperature of combustion, and, therefore, the effective value of the fuel. Mr. Davies said he had not calculated the temperature of combustion. The gas exhibited was then tested, and found

capable of heat
of nitrogen a dan
so far as Sir J
admitted that al
power to those c
contended that, i
could be produc

GLOBE STEEL
1877, when calli
and Co.'s Globe
boilers, we wrote
great faith in the
that events have
such a statement
Messrs. Barger
Boiler Powder
Kingdom. This
the iron trade, t
tions, and the di
ingredient. As
seen able to rep
for at least three
merits. Notwith
and Co. have al
have had time t
much as 1 ton
worked well, m
shire, Durham, J
Messrs. J. Barge
and more wide
who have adopt
position to avoi

April 25.—W
business in the
suddenly an exce
With better opp
gentleman who
verse view to t
it originally co
and when it w
step was emine
A majority of
attempted to g
result, or rather

It is said, an
has been taken
versally oppos
Urgent remon
shareholders, p
laid before the
far as they cou
old and obnox
yet two or thr
knowledge of
volve, passed
turn to the fir
sidered the a
made they cou
52 weeks' wor
and four mon
ingly on Satur
the resident d
proceeded to s
been previousl
that they had
decided to tak
sult was that
men througho
then. Feeling
have been mad
and give them
Under such
that the men
(Clitters), wh
Deron Consols
must be more
board, it has
interest of the
the present sy
Russell, too, h
men at Wheal

To us the p
the blunder of
conceivable of
duce wages, w
it might have
is a return to
surely that do
step has been
taken it will
be at the cost
men and to th
as ill judged a
Mr. Wickha
cially at Mou
assure our ho
if he is not be
upon Cornwall
as he says, the
as I feared, al
he will find t
and that ther
which, in spit
and an almos
up several of
make the san
must for Corn
Perhaps M
as one of his
show, is real
work in statu
experimental
cate ground i

A gentleman
with the cour
sciences, has
of Trebah, br
of the founde
Royal Cornwa
the office of M
It is very s
Condurrow h
tory report a
we doubt the
the present m
holders, and m
of Cornish m
An illustra
cious use of a
on Saturday
sions of whic
the base, wall
top, with 12 s
top; estimated
first weakening
quins standing
boring of the q
powder, the co
the masonry so

incapable of heating platinum wire beyond bright red; in the absence of nitrogen a dazzling white is obtained. Mr. T. W. Hartley did not go so far as Sir Francis Knowles in his condemnation of the gas, but admitted that all these water gases were infinitely inferior in heating power to those containing hydro-carbons. In replying, Mr. Davies contended that, notwithstanding the nitrogen, a great heating effect could be produced at a much less cost than with ordinary gas.

GLOBE STEAM-BOILER POWDER.—In the Journal of Sept. 15, 1877, when calling the attention of steam users to J. Berger Spence and Co.'s Globe Steam-Boiler Powder to avoid incrustation in the boilers, we wrote—"We may state that after examination we have great faith in the efficacy of their ingredient." We are glad to say that events have proved that we were perfectly justified in making such a statement. Barely six months have elapsed, and in that period Messrs. Berger Spence and Co. have supplied their Globe Steam-Boiler Powder to more than 60 of the largest concerns in the United Kingdom. This is a success considering the heavy depression of the iron trade, the great competition existing for similar compositions, and the difficulties always attending the introduction of a new ingredient. As may be expected, but few consumers as yet have been able to report upon it; it is necessary to use such compositions for at least three or four months before being able to test fully their merits. Notwithstanding this, however, Messrs. J. Berger Spence and Co. have already received very good testimonials, and many who have had time to test it have repeated their orders, some using as much as 1 ton per month. The Globe Steam-Boiler Powder has worked well, more especially in Somerset, Lancashire, Gloucestershire, Durham, Kent, Essex, &c. We may be allowed to suggest that Messrs. J. Berger Spence and Co. should reduce their price, and extend more widely the special advantages they have granted to those who have adopted the Globe Steam-Boiler Powder as the sole composition to avoid incrustation.

REPORT FROM CORNWALL.

April 25.—We do not as a rule expect much excitement or much business in the course of holiday time. This Easter, however, is decidedly an exception, thanks to the strike at Devon Great Consols. With better opportunities of gauging the state of local feeling than a gentleman who live in the Metropolis we have always held an adverse view to the five-weeks month. When the agitation against it originally commenced we saw and foretold that it was doomed, and when it was proposed to revive it we pointed out that the step was eminently injurious, and would lead to no good result. A majority of the managerial powers at Devon Great Consols has attempted to force it upon the miners there, and we now see the result, or rather one part of the result, for the end is not yet. It is said, and with truth, that the responsibility of the step which has been taken is a very grave one. The alteration is almost universally opposed by shareholders, agents, tradesmen, and miners. Urgent remonstrances have been sent up to the directors by local shareholders, petitions in firm but respectful language have been laid before them from the numerous employees, and the agents, so far as they could venture, have intimated in plain language that the old and obnoxious system could not with safety be reimposed, and yet two or three of the non-resident directors, having but imperfect knowledge of the serious consequences which such a step might involve, passed the following resolution, which is an undisguised return to the five-weeks month:—"The directors having further considered the alterations in the time and work of payment to be made they consider that for the future there should be for the 52 weeks' work 12 monthly payments, six months of four weeks, and four months of five weeks, making in all 52 weeks." Accordingly on Saturday, the usual monthly and setting day, Mr. Morris, the resident director, and Captain Isaac Richards, the chief agent, proceeded to set the bargains in Wheal Emma, the resolution having been previously read to the men, whereupon one of the latter stated that they had had a meeting in the morning, and had unanimously decided to take no bargains under the five-weeks system. The result was that not a single contract was let, and the whole of the men throughout the mines (in number about 600) struck there and then. Feeling in the locality is entirely with the men, and offers have been made by the tradesmen to raise subscriptions for them, and give them credit, if they will continue to hold out.

Under such circumstances we do not for one moment believe that the men will go in, especially when we find that at Gunnislake (Clitters), which is the largest mine in the neighbourhood next to Devon Consols, and which is under the local management, which must be more capable of dealing with such a question than a London board, it has been resolved by the committee unanimously that "the interest of the company will be best served by the continuance of the present system of payment of wages every four weeks." Wheal Russell, too, has pronounced against the five-weeks month, and the men at Wheal Crebor have refused to take any bargains under it. To us the point in dispute seems narrowed to such an issue that the blunder of attempting to reintroduce the old system is hardly conceivable on the part of business men. If it was wanted to reduce wages, which are already practically at the lowest point, surely it might have been done straightforwardly, and if all that is needed is a return to the old system of accountancy, as some would argue, surely that doubtful good was not worth this price. However, the step has been taken, and we do not believe that those who have taken it will be long in finding out its impracticability, only it will be at the cost of much loss to the mine, and much suffering to the men and to their families. To us, moreover, the time of action seems as ill judged as the act itself.

Mr. Wickham's letter on the yield of tin in Tasmania, and especially at Mount Bischoff, is certainly by no means calculated to reassure our home miners, only there is no particular cause for alarm if he is not better informed with regard to the Antipodes than he is upon Cornwall. Bad as things are down West it is hardly yet true, as he says, that "since that period (1874) the Cornish tin mines have, as I feared, almost become defunct." If he will only pay us a visit he will find that there are a good many rather lively corpses about, and that there is something to be said for the future of an industry which, in spite of Mount Bischoff and foreign complications abroad, and an almost unparalleled dullness at home, can yet not only keep up several old dividend concerns but establish new ones. If we make the same allowance of what he says about Tasmania as we must for Cornwall, the cause of alarm is not so very great after all. Perhaps Mr. Wickham had in view the collapse at New Consols as one of his data; that, as no doubt Mr. Symons's pamphlet will show, is really no exception. Mr. Symons will do an excellent work in stating authoritatively what the practical results of that great experimental work really were. It will be, however, rather delicate ground if he takes it up, as he hints, from the personal side.

A gentleman who took a lively interest in all matters connected with the county of Cornwall, and especially in mining and the allied sciences, has just died at the advanced age of 80.—Mr. Charles Fox, of Trebah, brother of the late Mr. R. W. Fox, F.R.S. He was one of the founders of the Polytechnic Society, of which, and of the Royal Cornwall Geological and the Miners' Association, he filled the office of President.

It is very satisfactory to find that the dividends at Peever and Condurow have been so rapidly followed up by the very satisfactory report at West Seton, though, like a good many practical men, we doubt the advisability of having declared a dividend there at the present moment. However, it will be gratifying to the shareholders, and not without its value as a further proof of the stability of Cornish mining, in spite of all that is said and done.

An illustration of the effects that may be produced by the judicious use of small quantities of explosives was supplied at Plymouth on Saturday last, by its blowing down a huge chimney, the dimensions of which were as follows:—212 ft. in height, 23 ft. square at the base, walls 7 ft. thick at base, and finishing 4 ft. thick at the top; with 12 ft. due at the base, and 4 ft. at top, making together 12 ft. across the top; estimated weight 4000 tons. The plan of operations for the fall consisted in first weakening the masonry on three sides of the square base, leaving all four corners standing, and the greater portion of two sides intact; then by a judicious boring of the quoins stones at three angles, and loading with small charges of gunpowder, the corner stones on three angles were simultaneously blown out, and the masonry so much shaken on those sides that the stack gradually collapsed,

and fell without throwing a stone or brick out of the broad pit in which it was built. Altogether there were 23 charges of Kennell blasting powder, containing in all about 25 lbs.; no dynamite was used. The holes were bored to the length of 2½ ft., and 2 in. in diameter. There was a little over 1 lb. of powder to each hole, and nine charges were placed at the east angle, eight at the south angle, and six at the north angle. The judicious manner in which the work was carried out reflects great credit on Messrs. Hilsen and Walker, by whom it was executed.

REPORT FROM NORTH AND SOUTH STAFFORDSHIRE.

April 25.—On account of the Easter holidays the works and collieries have been idle during the first half of the week, and in a good number of instances operations will not be resumed at all this week. The demand for iron and coal has seen little, if any, improvement since the Quarterly Meetings came off, and those proprietors are the exception who have orders on their books which will take long to execute. The fear of war still exercises a very prejudicial effect in business circles, and it is the general opinion that there will be no settled improvement in trade until the existing uncertainty is removed. Pig-iron as a rule is dull, and the present production does not exceed one-half of that of former years, which, moreover, found a ready sale. Out of 148 furnaces built only about 44 are blowing. Three years ago the number at work was from 95 to 100, and a year back rather over 60 were in blast. For all but high-class pig-iron, which is firm, the tendency of prices is in favour of buyers. Native ironstone is scarce and dear. Finished iron prices are without alteration in the open market, but medium and common qualities in actual transactions are easy. The Coal Trade is languid in all departments, and prices are very low. Slack is slow of sale at about 3s. per ton, of as good a quality as that which formerly fetched a very much higher price.

The Hamstead Colliery Company (Limited) have just issued their third annual report. The caving of the shaft has been completed, and the pumping shaft has reached a depth of 200 yards. There has been no fresh accumulation of water since a depth of 175 yards was reached, and the supply there is at the rate of 50 gallons a minute. A chamber is being formed at a depth of 175 yards, which appears to be the bottom of the water-bearing strata, where the water will be collected, and pumped to the surface. A favourable indication of the presence of coal is the finding at a depth of 186 yards of the Spirorbis limestone. With a view to securing early information as to the presence or otherwise of coal at the adjoining sinkings of the Perry Company, the directors have voted 500l. towards the expense of the Perry boring on certain conditions. Mr. Isaac Meachem has been appointed resident mine manager.

Circulars have been issued announcing to shareholders that the directors of the John Bagnall Ironmaking Company, of Wednesbury, propose to reduce the share capital from 160,000l. to 48,000l. by dropping the 10l. shares to 3l. each. It is also proposed to raise 96,000l. by means of 48,000 shares of 2l. paid, but to rank as 3l. five per cent. preference shares, with priority of claim also to assets. In depreciation and loss the concern is poorer than it was four years ago by 149,000l.

A quarterly meeting of the committee appointed to distribute amongst the widows and orphans of miners who meet their deaths by colliery accidents the interest of the principal of the South Staffordshire Hartley Colliery Surplus Fund has been held in Wolverhampton, and it decided that the title of the fund shall be the "South Staffordshire and Worcestershire Mine Accident Fund." It was resolved to invest the principal (3200l.) in Great Western Railway Five per Cent. Consolidated stock, and a form of application for gratuities was determined upon.

At an annual gathering of the miners of the Cannock Chase United districts, which has taken place at Hednesford, complaint was made that the East Cannock Colliery Company were attempting to depart from the recent award of Mr. Chamberlain, M.P., and the meeting decided to repel any such attempt at that or any other colliery. Much distress exists amongst a great part of the mining population of Cannock.

The North Staffordshire finished iron trade is not active, the foreign demand being especially dull. The limited make of pigs is somewhat readily sold, and stocks are decreasing. Ironstone is low in price, and not easy to sell. The market is plentifully supplied with coal and slack; the demand is depressed.

REPORT FROM MONMOUTHSHIRE AND SOUTH WALES.

April 25.—A meeting of the debenture-holders of the Great Western Colliery Company, which is now in liquidation, was held at Bristol. Mr. J. Wethered, colliery proprietor, presided, and the meeting was called by direction of Vice-Chancellor Hall, to ascertain the wishes of the debenture holders in regard to the reconstruction scheme. This was agreed to, and the Chairman expressed the belief that if the colliery were carried on with ordinary economy and good management there was no doubt that every debenture and preference shareholder would get back every sixpence of their money—a "consummation devoutly to be wished."

There appears to be a probability of the Barry Port Lead and Silver Smelting Works being re-started within a few weeks, if rumour is correct. The company failed in February, 1877, and the liabilities were more than 350,000l. Now, it is said, the whole concern has been handed over to Mr. J. W. Williams, Farcroft, Handsworth, near Birmingham, who intends to carry it on personally. He was the principal mortgagee, holding security for over 60,000l.

A meeting of the debenture-holders of the Dynevor, Duffryn, and Neath Abbey Collieries Company has been held for the purpose of determining "what is the best course to be adopted in the interests of the debenture-holders, in view of the two petitions to wind up the company which have been presented to the High Court of Justice." The matter was referred to a committee consisting of two trustees and three debenture-holders—Messrs. Bidder, Q.C., Marlow, and Ryland. A resolution was also passed asking Mr. Callum to stay his petition—at least for a time.

The body of the boy Davies, who was drowned by the flooding of the Western Moor Colliery, Neath, has been discovered. One body, that of a man, remains unrecovered.

The Iron Trade remains in about the same state, so far as the amount of work in hand and prices are concerned; at the same time it is certain that a better demand is apparent for the best descriptions of iron and steel. Orders, too, for iron rails for South America and Canada are known to be in the market, and Welsh masters have a fair chance of securing the lion's share of these. Clearances have been fairly kept up of late, and now that times are bad, there has not been much holiday making among the men, as used to be the case when wages were high and trade active. For iron rails there seems to be rather a better enquiry, but bars are still in limited request; Dowlaish, however, has some decent orders in this department. The Steel Trade is fairly active as times go, although orders are not at all brisk in coming to hand. The main complaint, both in this and the iron industry, still is as to the lowness of prices.

Important proceedings in reference to the Tin-Plate Trade have taken place during the week. For a long time prices have been receding, until at last no one denies that they are utterly unremunerative to manufacturers. No doubt over-production has been a fruitful source of this. During the week a meeting of the entire trade has been held at Swansea. There were 144 mills represented at the meeting—not quite three-fourths, as the total is a little over 200. The resolutions, the pith of which is given below, were carried subject to the assent of the owners of 20 more mills, which will, doubtless, be obtained. In the first place, the make is to be reduced one-third from April 29, for three months, such reduction to be based on the maximum make of 450 boxes for each steam and 350 for each water mill. To see this restriction is properly carried out a public accountant is to be appointed to inspect the books, and a deed binding each signatory, under a penalty of 500l., to faithfully carry out the arrangement is to be drawn up. It was also resolved to re-organise the manufacturers' association, and appoint a council and president, which of course means a revival of the quarterly meeting, and the consequent establishment of the trade on a firmer basis.

The Coal Trade has not materially changed during the week. The demand for steam coal, especially in the direction of the Mediter-

anean, continues good; prices, however, though firm, have not improved. Indeed, there seems no indication of a rise. The collieries generally are not regularly employed, but coal is very abundant. Steam coal freights to the Mediterranean are firmer. House quantities are in anything but brisk demand. Patent fuel is very dull.

THE TIN-PLATE TRADE—PROPOSED REDUCTION OF MAKE FOR THREE MONTHS.—One of the largest meetings of the tin-plate manufacturers that has been held for a long time past took place on Tuesday at the Mackworth Arms Hotel, Swansea, to consider the propriety or otherwise of reducing the make of tin-plates, in view of the depressed condition of the trade. When we state that 125 mills were represented in the room, and 19 by letter, nearly two-thirds of the mills of the United Kingdom, it will at once be seen that the gathering was, as already stated, of an important character. The following gentlemen were present—Mr. P. Woodruff, of Machen, in the chair; Messrs. Sanders (Cookley), Flower, Whitehouse, G. Morris, Baldwin, W. H. Francis, Hosgood, W. Jones, R. Hughes, D. Owen, D. Davies, E. R. Daniel, J. R. Jenkins, J. J. Jenkins, Booker and Co., P. Phillips, D. Morris, C. Conway, G. B. Strick, Spence, J. O. Hill, Josiah Griffiths, T. J. Newman, and John Evans (Cambrian Co-operative Tin-Plate Works, Pontardale), Williams (Pontypool), Williams (Ynyspenllwch), E. Davies and R. Jenkins (Avon Vale), D. Grey, W. Williams (Morrison), and Thomas (Lydbrook and Lydney). The meeting lasted a considerable time, and a good deal of discussion took place, the result being that the following resolutions were unanimously agreed to:—"That the make be reduced one-third for three months from April 29—such reductions to be based upon the maximum make of 450 boxes for each steam mill, and 350 for each water mill—each maker to reduce in any way most convenient to him, so that a full and effectual reduction of not less than one-third is made in the month. That a public accountant be appointed to examine and certify from the pay book of each works at the beginning of every month the make of the mills of such works for the preceding month. That no mill be started during this time that has not been at work for the last three months. That a deed be drawn up binding each firm faithfully to conform and carry out this arrangement under a fine or penalty of 500l., to be recoverable in a court of law. That a reorganisation of the trade association be formed, and a President and Council be appointed." These resolutions are contingent—that is to say, if 164 mills will agree to the arrangement, it will be carried out; if not, it will fall through. It is believed that another meeting will shortly be called to confirm the proceedings of the present meeting. The resolutions are fraught with interest to the tin trade in the present commercial crisis.—*South Wales Daily News.*

TRADE OF THE TYNE AND WEAR.

April 24.—The improvement in the Steam Coal Trade in Northumberland, noticed last week, has continued, and, on the whole, this branch of the trade has been fairly brisk. In the Blyth district the works have been kept regularly going, and there is a better demand for this coal. It is also expected that contracts will be entered into shortly, which will insure more regular employment in future. At any rate negotiations are in progress in order, if possible, to secure these contracts. The claims for reduction in the tonnage rate at Cramlington and a few other places have not yet been settled, and some complications may arise from this cause.

By the official report on the experiments as to the suitability of various kinds of coal made on board the German gunboat Nautilus during her recent voyage, it appears that Japanese Taku coal, a mixture of one-third South Wales coal and two-thirds West Hartley coal, and German coal were severely tried. With regard to the German coal the report states that good results were obtained, but the cinders adhered too much to the grate, and too much time was consumed in kindling the fire. The coal was also drowsy. Mixed with West Hartley coal it did very well. The mixture of West Hartley and South Wales was the most satisfactory, being preferable to either pure South Wales or pure Westphalian coal. It will be seen that those results agree very nearly with those obtained by numerous experiments at various times carried out in the ships of the British navy. There is no doubt whatever that those two coals hold a position superior to any other steam coal.

An engine, to perform the work of the pony putter in colliery work, has been tested in East Herrington Colliery. The engine is the invention of Mr. Lishman, managing viewer of the Lambton Collieries, and Mr. Young, engineer, Bunker's Hill, and is worked by compressed air. The "putter," dragging three tubs, proceeded into the workings, doing a journey of over a mile, and returned in little over ten minutes, which work would have occupied a horse for about half an hour. The engine worked all day without a hitch, and at a very considerable saving in cost of working. Several of these engines are in course of construction at the Lambton engine-shops at Philadelphia. This locomotive appears to be designed for the purpose of performing the work usually assigned to ponies driven by boys near the face of the workings, but there is no reason why the engine or those of similar construction should not be employed in drawing the coals in the main roads instead of hauling-engines and wire-ropes.

About fifty of the enginemasters, mechanics, and workmen met at the Hetton Colliery Hotel, and presented a handsome gold watch, gold chain, and a purse of gold to Mr. Moor, who has been for 30 years engineer under the Hetton Coal Company (a pair of gold eye-glasses were also presented to Mrs. Moor), as a token of the high esteem in which he is held. The chair was occupied by Mr. W. H. Lambton, and the vice-chair by Mr. J. Robinson. The presentation was made by Mr. James Young, of Elemore Colliery, one of the first apprentices bound under Mr. Moor at Hetton Colliery. A very agreeable evening was spent. Mr. Moor was trained at Killingworth Colliery, under the late Mr. Nicholas Wood, by whom he was removed to Hetton.

REPORT FROM NORTH WALES, SALOP, AND CARDIGAN.

April 25.—Among the collieries of this district that during these times of depression have been preparing their works for an extended output when trade revives may be mentioned that of Cae Penly, near Wrexham. A new shaft has been taken down to the Main coal, and workings opened out in this seam, which here is of very good quality. The colliery has been connected with both the Great Western and the Wrexham and Connah Quay Railway, and the whole of the works pushed well forward. With the return of spring the demand for home and gas coal slackens, while the competition is keen, and the orders much divided at barely remunerative rates. In steam coal we may soon receive a margin of benefit from the orders for naval purposes that are flowing into other districts. The prospectus is issued of the St. Martin's Colliery Company, with a capital of 2000l., for the purpose of working the coal seams in the Permian, near the village of that name. It is not often that so small a capital suffices for the working of a colliery, but the promoters hope that "with energy, efficiency, and economy the undertaking will be successful." As soon as the underground roads, which are said to extend upwards of a mile, are with the pits drained of the water that now fills them coal getting will commence.

The old slate quarry at Llangynog is about to change owners. This is one of the oldest slate quarries in North Wales, and is at the present time in capital working order. It possesses an almost unlimited supply of good slate. The other slate quarry trials near Llangynog—the Parsons, Gubbin, and Bwlch Gwyn—are all proceeding satisfactorily. The Maengwynedd Slate Quarry also is likely to pass into the hands of a company. All that is wanted to the complete success of these and other mineral undertakings of that locality is a tram or railroad from Oswestry to Llangynog. Who will start the movement for the construction of one? The partnership known as Dennis and Co. for the working of the Cefn Freestone Quarries is dissolved, and the quarries enter upon a new arrangement.

Little can be said concerning lead mines this week. The ordinary paying mines, perhaps, show a little weakness, and the hopeful ones are passing through the usual fluctuations and hope. Some of these latter, formed and worked on ordinary business principles, seem advancing towards success, but there seems to be a strong desire on the part of some of the more pretentious ones to share with the investing public the fortunes that are to be made. There are no discoveries of note, and the tidings from some of the progressive mines are hardly so satisfactory as could be desired.

The attention of the Geological Society has recently been directed to the lower rocks that underlie the workable slates of Carnarvonshire. Dr. Hicks and one or two others think they belong to the older group than the Cambrian, usually known as the Laurentian, some divisions of which Dr. Hicks has in Pembroke-shire named Pebidian and Dimitian—names, I venture to say, that will never be generally accepted. The question is of little practical value, being one chiefly of name. Mr. G. Man, F.G.S., Benthall Hall, Bromley, has also detected an unconformability in the slates of Llanberis; but such

forms of this furnace constructed has a partial brick-lined cylinder, which is better adapted to the treatment of some descriptions of ore than the full brick-lined cylinder. The furnace made in either one or the other forms, having the full or partial brick-lined cylinder, has been erected and successfully operated at mines in California, Nevada, and Arizona Territory—Jefferson, Commanche, Leopold, Ural, Star, Navajo, Grand Prize, Peck, Tiptop, Hackberry, and Edmondson, and at least ten of them are now in successful operation, in some of the cases reducing ores of the most refractory character.

NEW STEAM-ENGINE GOVERNOR.

The improved governor invented by Mr. E. G. KLEMM, of Eckernförde, Germany, consists essentially of a shaft driven either directly or through the intervention of a strap or gearing from a first motion shaft worked by a horse-power or other like contrivance, or by hand. On a central boss fixed on the governor shaft there is pivoted a fly-wheel, the rim of which in its normal position is inclined to the axis of the said shaft in lieu of being at right angles thereto. A second boss is also mounted on the governor shaft, and is free to be adjusted or turned thereon, and to be moved longitudinally by such adjustment by having the contact faces of the fixed and adjustable bosses made inclined. A set screw in the adjustable boss serves to fix it in any required position when adjusted. In a recess made in the outer face of the adjustable boss there is fitted one end of a helical spring which surrounds the shaft, the opposite end of such spring pressing against a sliding boss or collar, which is grooved circumferentially to receive the forked end of a lever for actuating a pair of strap guides. The rim of the fly-wheel is connected by a rod or link with the last-mentioned sliding boss or collar, and the helical spring tends constantly to press such boss or collar outwards, and to keep the rim of the fly-wheel at an inclination to the governor shaft. On imparting a rotary motion to this shaft the rim of the fly-wheel, by the action of centrifugal force, is caused to approach nearer to a right angle to the shaft, thereby drawing inwards the sliding boss or collar, and compressing more or less the helical spring. As the speed diminishes the spring expands and forces outwards the sliding boss or collar, thus imparting motion to the lever which actuates the strap guides.

By adjusting the moveable boss so as to vary the power of the spring, the governor may be made more or less sensitive, as required. The strap guides, of which he prefers to employ two, serve to guide a strap along two reversed cone pulleys, one of which is mounted on the governor shaft itself, whilst the other is mounted on the shaft to be driven, the tension of such strap being regulated by mounting the bearings of the driven shaft in slots, and adjusting the position of the said shaft by levers worked by rack-and-pinion motion from a hand-wheel. The regulated or equalised driving motion may either be transmitted direct from the last-mentioned shaft to the machine to be driven, or from a second shaft driven therefrom by gearing, or otherwise. The strap guides consist of two forked levers crossing each other and working on fixed centres at opposite ends; these arms are coupled together by a link, so as to guide the strap along each cone pulley simultaneously and in concert, and one of them is further connected by another link to the free end of the forked lever herein before referred to, from which they both derive their movements.

An invention, having for its object the manufacture of an artificial iron ore by the employment of a heating or calcination process, by means of which pulverulent or granular ores, and in particular residues of roasted iron pyrites, may be agglomerated without the addition of any foreign substances, when the resulting compounds contain a certain proportion of silex, alumina, and other mineral substances, well adapted to facilitate their agglomeration, has been patented by Mr. JULES CAHEN, of Paris. He prefers to employ a high temperature in order that by the calcination a compact material may be produced. For this purpose it is sufficient when the materials are in a state of very fine dust or powder to mould them either by hand or by mechanical means, without the addition of any agent, and to expose the blocks thus formed to a calcination at an elevated temperature obtained in a furnace, or by any one of the means employed for burning bricks. When the materials are in small fragments or in a granular form, and it is desired to avoid pulverising them, the moulding may be effected by means of machines capable of compressing the materials, and the blocks obtained by these means may then be treated as before mentioned.

Any process of heating or of calcination may be adopted, the object being that the temperature employed should be sufficiently elevated. Experience has, however, shown that there is considerable advantage in effecting the heating of the materials in a furnace the atmosphere of which is oxidising. It will be found that the blocks thus calcined do not undergo during the calcination or heating either segging or yielding, or partial fusion or reduction, whilst when they are exposed to the action of a reducing atmosphere the blocks become partially modified and altered. The materials, either in a dry or pasty condition, are moulded into blocks either by hand or by machines, and after desiccation the moulded blocks are burnt or heated at an elevated temperature without the addition of any foreign substance.

It is well known that enormous accumulations of scorine and residues containing valuable metals exist in various places, and that in many cases these have remained commercially useless, owing to the cost of extracting the valuable metals when present only in small quantities, and to the difficulty of usefully employing ferrous alloys which would result from smelting them. Many of these scorine and residues contain a large percentage of iron, together with smaller percentages of more valuable metals; this is notably the case in scorine resulting from ancient metallurgical operations. For example, at the Rio Tinto Mines, in Spain, ancient scorine and residues from modern workings exist, containing iron, copper, and small percentages of other metals, and these residues are being daily augmented, and are not utilised. As another example of metalliferous substances that could be utilised by a similar process may be mentioned ores containing iron and small percentages of more valuable metals, also minerals containing metals which cannot at present be economically extracted. As further examples may be cited, burnt ore of cupreous pyrites, after it has been treated for the production of sulphuric acid, and any metalliferous refuse from ore washings. As such burnt ore does not generally contain much silica, Mr. JOHN HOLLOWAY, of Jeffrey's square, proposes to smelt it preferably with siliceous refuse from copper ore washings, adding the necessary fluxes; thus whilst providing silica to form slag the percentage of copper would be increased in the product by any copper released from the aforesaid siliceous refuse; the product would be an alloy of iron and copper. He proposes to smelt such metalliferous substances in an ordinary or other blast-furnace with suitable fluxes, adding if desired other substances, and thus obtain ferrous alloys. In some cases metals would be reduced separately from the ferrous alloys, such as lead, and in other cases the metals could be reduced as amphiboles, such as oxides of zinc, lead, and arsenic.

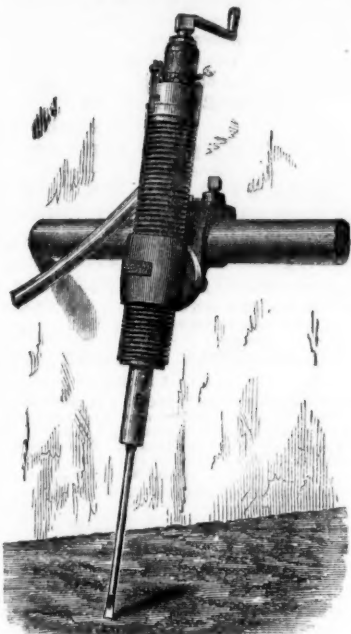
Although no special preparation has thus far been resorted to, Mr. Hollway would by preference pulverize the metalliferous substances and mix them with the necessary fluxes and carbon, and form cement, or coke them into lumps or blocks convenient for smelting; and he mentions as some of the advantages of so doing—firstly, the disintegration of the various materials employed renders it possible, if desired, partially to separate, classify, and treat the heavier metals by themselves, also to remove objectionable matter by washing or other means; it also renders the reduction more facile owing to the particles of oxides or metalliferous substances being brought into direct contact with carbon, and the silica being also brought into similar direct contact with the bases necessary for fusion, hence a smaller quantity of metal is lost in the slag; secondly, the various substances can be arranged in the mixture so that deficiency or excess of any of the constituents can be compensated, and in this way specific alloys can be produced, containing desired proportions of various

In fixing the machine after it is laid against the tree the machine is drawn tight against the butt by the screw and chain above mentioned, and owing to the high-pressure steam the piston, and, consequently, also the saw, works very rapidly. The working capacity of this steam tree-feller is stated to fell under ordinary circumstances from four to six trees averaging 30 in. in diameter per hour. As the machine will work in almost every position it may

FOUR MINES CERTAIN FOR A RISM.

"DARLINGTON" ROCK BORER.

NO VALVE.



SCREW, OR CRADLE MOUNTED, BORING MACHINES.

AIR COMPRESSORS, DRIVING AND SINKING APPARATUS.

JOHN DARLINGTON, 2, COLEMAN-STREET-BUILDINGS,
MOORGATE STREET, LONDON, E.C.**ASBESTOS.**

A NEW and INDESTRUCTIBLE ASBESTOS PACKING for steam joints and glands, possesses an unusual power of resisting heat, works efficiently under the highest pressure of steam, being practically indestructible. Apply to—

THE PATENT ASBESTOS MANUFACTURE CO. (LIMITED),
31, ST. VINCENT PLACE, GLASGOW,
AND 10, MARSDEN STREET, MANCHESTER.

THE

DARLINGTON WAGON COMPANY,

MANUFACTURERS OF

RAILWAY WAGONS

OF EVERY DESCRIPTION,

For Cash, or on Deferred Payments, or Hire.

REPAIRS EXECUTED WITH DESPATCH, ON REASONABLE TERMS.
OFFICES AND WORKS,

ALBERT HILL, DARLINGTON.

PATENT DUPLEX LAMPS

FOR COLLIERIES, IRONWORKS, &c.

SUITABLE FOR PIT BANKS, ENGINE HOUSES, &c., &c.

Each Lamp gives a light equal to 26 candles.
No breakage of Chimneys from heat.
Cottens last three months.
Will burn any mineral oil.**S. HOOPER,**LAMP MAKER & OIL MERCHANT,
LOWER TEMPLE STREET,
BIRMINGHAM.

N.B.—Lamps made suitable for every purpose.

The BEST SIGNAL BELL MADE for MINING PURPOSES.

ILLUSTRATIONS ON APPLICATION.

**WIRE ROPES.****JOHN AND EDWIN WRIGHT,**

PATENTERS,



ESTABLISHED 1770.

MANUFACTURERS OF EVERY DESCRIPTION OF IMPROVED

Patent Round and Flat Wire Ropes,

From the very best quality of Charcoal and Patent Steel Wire. Galvanised Wire, Ropes for Ships' Rigging, Galvanised Signal and Fencing Strand, Copper Rope Lightning Conductors, Colliery Ropes and Steam Plough Ropes made from the best Patent Improved Steel Wire.

PATENT ROUND AND FLAT HEMP ROPES,
Hemp, Flax, Engine Yarn, Cotton Waste, Tarpauling, Oil Sheets, Brattice Cloth, Wagon Covers, &c., &c.UNIVERSE WORKS, MILLWALL, POPLAR, LONDON.
UNIVERSE WORKS, GARRISON STREET, BIRMINGHAM.
CITY OFFICE, No. 8, LEADENHALL STREET, E.C.

All communications to be forwarded to the BIRMINGHAM ADDRESS.

Now ready, price 3s., by post 3s. 3d., Sixth Edition; Twentieth Thousand Copies much improved, and enlarged to nearly 300 pages.

HOPKINSON'S CONVERSATIONS ON MINES, between Father and Son. The additions to the work are near 80 pages of useful information, principally questions and answers, with a view to assist applicants intending to pass an examination as mine managers, together with tables, rules of measurement, and other information on the moving and propelling power of ventilation, a subject which has caused so much controversy.

The following few testimonials, out of hundreds in Mr. Hopkinson's possession, speak to the value of the work:—

"The book cannot fail to be well received by all connected with collieries."—*Mining Journal*."Its contents are really valuable to the miners of this country."—*Miners' Conference*."Such a work, well understood by miners, would do more to prevent colliery accidents than an army of inspectors."—*Colliery Guardian*.

London: MINING JOURNAL Office, 28, Fleet-street; and to be had of all book sellers.

THE NEWCASTLE DAILY CHRONICLE

(ESTABLISHED 1764.)

THE DAILY CHRONICLE AND NORTHERN COUNTIES ADVERTISER

Offices, Westgate-road, Newcastle-upon-Tyne; 50, Howard street, North Shields; 195 High-street, Sunderland.

ORMEROD, GRIERSON, AND CO.

ST. GEORGE'S IRONWORKS, MANCHESTER,

Engineers, Millwrights, & Boiler Makers,

MANUFACTURERS OF

Stationary Steam Engines and Boilers for all purposes, Mill Gearing, Sugar Machinery, Cranes, Turn-Tables, and Railway Fixed Plant of all descriptions; also, the Diamond Rock Boring Company's Plant—viz.: Compressed Air and Air-Compressing Engines, Prospecting Machines, Tunnelling Machines, and Shaft Sinking Machines.

HYDRAULIC PRESSES OF VARIOUS KINDS

Have the Largest Assortment in the Trade of

PATTERNS,

WITH MACHINE-CUT TEETH, OF

SPUR WHEELS, BEVEL WHEELS,

MITRE WHEELS,

ALSO

FLY WHEELS.**DRIVING PULLIES & DRUMS,**

CAN BE SUPPLIED BORED AND TURNED IF REQUIRED.

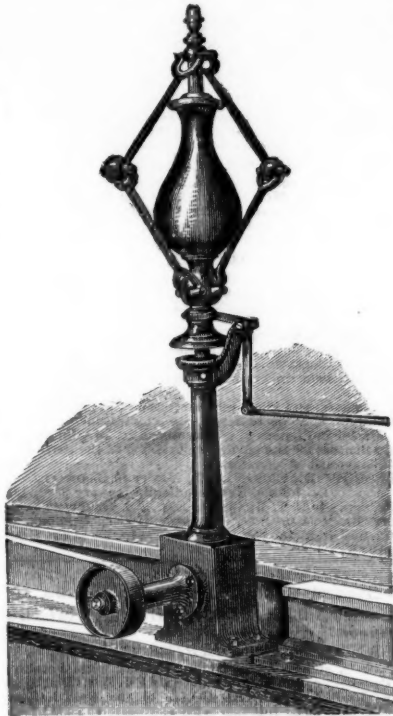
CATALOGUES ON APPLICATION.

LONDON OFFICES:

No. 5, WESTMINSTER CHAMBERS,

VICTORIA STREET,

WESTMINSTER, S.W.



Porter's Governor for Stationary Engines. Also Governors on the same principle adapted for Marine Engines.

STEVENS' PATENT UNDERGROUND WINDING ENGINE,

DESIGNED FOR USING COMPRESSED AIR OR STEAM,

SIMPLE, COMPACT, PORTABLE.

Silver Medal, Royal Cornwall Polytechnic Society, 1874.

No. 1 size, 7 in. single cylinder, with 2 ft. drums.

No. 2 size, 9 in. single cylinder, with 2 ft. 6 in. drums.

Larger sizes made with two cylinders.

A.—6 in. double cylinder, with 2 ft. 3 in. drums.

B.—8 in. " " 3 ft. 0 in. drums.

C.—10 in. " " 3 ft. 6 in. drums.

D.—12 in. " " 4 ft. 6 in. drums.

MANUFACTURED BY

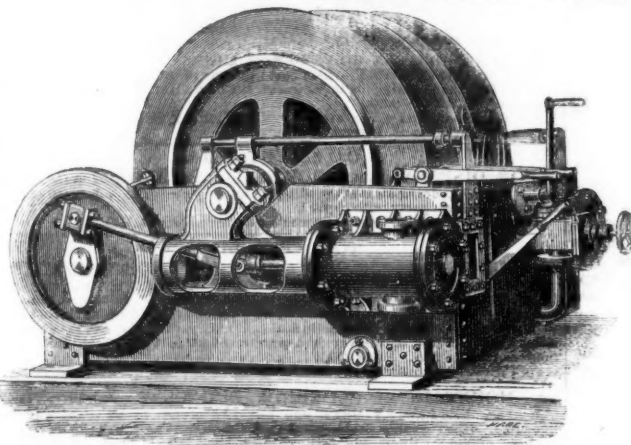
THE USKSID CO.,

ENGINEERS, MAKERS OF PUMPING AND WINDING MACHINERY, AND FORGINGS OF EVERY DESCRIPTION,

NEWPORT, MON

Agents for the six Northern Counties—
TANGYE BROTHERS, ST. NICHOLAS BUILDING
NEWCASTLE-ON-TYNE.

[This Advertisement appears fortnightly.]

**JOHN MARSDEN,**

MANUFACTURER OF

Air Tubing and Improved Brattice Cloth,

Tarred, Oiled, and Non-Inflammable.

THE OILED CLOTH IS ESPECIALLY RECOMMENDED FOR DAMP MINES, AND IS ALSO A GOOD COVERING FOR SHEDS.

THE NON-INFLAMMABLE FOR THE MORE DANGEROUS MINES.

Samples and prices free, on application at the Works,

**VARLEY STREET, OLDHAM ROAD,
MANCHESTER.****The "BURLEIGH" ROCK-BORING COMPANY
(LIMITED).**

100, KING STREET, MANCHESTER.

RICHARD MOTTRAM, Secretary.

For the Sale of the "Burleigh" Rock Boring Machinery; and also for Sinking Shafts, Cutting Tunnels and Levels, and General Rock Blasting Operations by Contract.

References permitted to—

Messrs. BOLCKOW, VAUGHAN, AND CO. (LIMITED), Middlesbrough.

" THE DOWLAIS IRON COMPANY (LIMITED), South Wales.

" THE EBBW VALE STEEL IRON, AND COAL COMPANY (LIMITED), South Wales.

" THE CRUMLIN VIADUCT WORKS COMPANY (LIMITED), South Wales.

" T. T. J. WALLER, Esq., Railway Contractor, Gisburn, near Skipton.

" TURNER AND SON, Limestone Quarries, Kiverton Park, near Sheffield.

CATALOGUES AND PRICE LISTS OF MACHINERY FORWARDED ON APPLICATION TO THE COMPANY'S OFFICE.

NOBEL'S DYNAMITE

Is the MOST ECONOMICAL and POWERFUL EXPLOSIVE for every kind of MINING and QUARRYING OPERATIONS; for blasting in hard or soft, wet or dry ROCKS; for clearing land of TREE ROOTS and BOULDER STONES; for rending massive BLOCKS of METAL; for SUBAQUEOUS and TORPEDO purposes; and for recovering or clearing away of WRECKS, &c.

ITS SAFETY is evidenced by the total ABSENCE OF ACCIDENTS in transit and storage; it is insensible to heavy shocks its GIANT POWER being only fully developed when fired with a powerful percussion detonator, and hence its great safety.

As a SUBSTITUTE FOR GUNPOWDER its advantages are the GREAT SAVING OF LABOUR, rapidity and INCREASE OF WORK done, FEWER and smaller BORE-HOLES required, greater depth blasted, safety in use NO DANGER FROM TAMPING, absence of smoke, unaffected by damp, &c.

For information, apply to the—

NOBEL'S EXPLOSIVES COMPANY (LIMITED), GLASGOW;
OR AT THE

London & Export Office, 85, GRACECHURCH STREET, LONDON E.C.

TONITE, OR COTTON POWDER.

THE SAFEST, STRONGEST, AND CHEAPEST OF ALL EXPLOSIVES.

Recommended to MINERS, PIT SINKERS, QUARRYMEN, and CONTRACTORS as the MOST EFFICIENT and ECONOMICAL BLASTING AGENT ever invented.

Results of practical experience show a saving of from 15 to 20 per cent. over the strongest explosives previously in use.

It saves labour in drilling holes, as a less number of holes are needed.

It does not require thawing, but is ready for use at all temperatures and in all climates.

It can also be advantageously used in breaking up boulders, extracting stumps, removing wrecks, exploding torpedos, and for submarine purposes in general, as well as for signal lights and fog signals for ships.

OFFICES:

23, QUEEN ANNE'S GATE, LONDON, S.W.
WORKS: FAVERSHAM, KENT.

Agents DINEEN, SON, and Co., Leeds; JOHN RUSSELL, Whitehaven; R. J. CUNNACK, Helston, Cornwall; J. and W. SMITH, Chapel-en-le-Frith; W. VEITCH, Jedburgh, N.B.

THE BRITISH DYNAMITE COMPANY VERSUS MESSRS. KREBS & COMPANY.

THE COURT OF APPEAL HAVE REVERSED THE DECISION OF MR. JUSTICE FRY, AND DISSOLVED THE INJUNCTION GRANTED BY HIM; AND DISMISSED THE ACTION, WITH COSTS, AGAINST THE PLAINTIFF COMPANY.

MESSRS. KREBS BROTHERS AND CO. ARE PREPARED TO EXECUTE ORDERS FOR LITHOFRACTEUR BOTH FOR HOME AND FOREIGN CONSUMPTION AS USUAL.

Address,— MESSRS. KREBS BROTHERS AND CO.,
22, BASINGHALL STREET, LONDON, E.C.

J. W. SEYD, Agent.

TO PROPRIETORS OF MINES.

BLASTING POWDER

OF THE STRONGEST DESCRIPTION, THOROUGHLY TESTED. HIGHEST TESTIMONIALS FROM FIRST-CLASS ENGINEERS. ACCIDENTS IMPOSSIBLE. WILL BURN GRADUALLY AND NEVER EXPLODE, EXCEPT WHEN WELL RAMMED IN AND FIRED IN THE USUAL WAY. THE MORE IT IS RAMMED THE STRONGER ITS FORCE. MANUFACTURED COST PRICE 2d. PER POUND.

THE PATENT FOR SALE, or the Powder supplied in large quantities on royalty.

Apply, post paid, to—

MESSRS. SPRENT, SPRENT, AND PHIPPS,
HOUSE, ESTATE, AND COMMISSION AGENTS,

240, RUE DE RIVOLI, PARIS.

THE TUCKINGMILL FOUNDRY COMPANY

(TUCKINGMILL FOUNDRY AND ROSEWORTHY HAMMER MILLS),

CAMBORNE, CORNWALL,
Engineers, Iron and Brass Founders, &c.,

MAKERS OF EVERY DESCRIPTION OF

MINING MACHINERY, SHOVELS, GEARWORK,
PUMPING, WINDING, AND STAMPING ENGINES.

ALSO OF

BLAKE'S STONE BREAKERS.

SOLE MAKERS OF

BORLASE'S PATENT ORE-DRESSING MACHINES AND PULVERISERS.

ESTIMATES GIVEN UPON INDENTS AND SPECIFICATIONS.

ILLUSTRATED CATALOGUES POST FREE ON APPLICATION.

LONDON OFFICE: 85, GRACECHURCH STREET, E.C.

THOMAS TURTON AND SONS,

MANUFACTURERS OF

MINING STEEL of every description.

CAST STEEL FOR TOOLS. CHISEL, SHEAR, BLISTER, & SPRING STEEL.

MINING TOOLS & FILES of superior quality.

EDGE TOOLS, HAMMERS, PICKS, and all kinds of TOOLS for RAILWAYS, ENGINEERS, CONTRACTORS, and PLATELAYERS.
LOCOMOTIVE ENGINE, RAILWAY CARRIAGE and WAGON SPRINGS and BUFFERS.

SHEAF WORKS & SPRING WORKS, SHEFFIELD.

LONDON OFFICES.—35, QUEEN STREET, CITY. PARIS DEPOT.—12, RUE DES ARCHIVES.
NEW YORK STORE.—102, JOHN STREET.

"Kainotomon" Rock Drill

SELECTED BY THE

BRITISH, PRUSSIAN, & SAXON
GOVERNMENTS.

SUPERIOR
Air-Compressors, Coal-
Cutters, Pumps, and all
Mining Machinery.



Secondhand ROCK DRILLS
FREYDON AND DAVIDSON'S
make £25 each new £32

T. A. WARRINGTON,
30, King-street, Cheapside,
LONDON E.C.

THE PHOSPHOR BRONZE COMPANY (LIMITED).



139, CANNON STREET, E.C
LONDON.

Alloy, No. II., for pinions, ornamental castings, steam fittings, &c.	£12 (per ton)
" No. IV., for pinions, pumps, valves, linings, cylinders, &c.	130 "
" No. VI. (must be cast in chill) for bolts, &c.	140 "
" No. VII., for hydraulic pumps, valves, and plungers, piston rings, bushes and bearings, for steel shafts	140 "
" No. XI., special phosphor-bronze bearing metal, wearing five times as long as gun metal	112 "

The prices of castings vary according to the pattern, the quantity required, and the alloy used.

WIRE ROPES, TUBES OF ALL DESCRIPTIONS, &c.

CRAVEN AND SPEEDING BROS., MANUFACTURERS OF EVERY DESCRIPTION OF WIRE AND HEMP ROPES

FOR

COLLIERIES, RAILWAYS AND SHIPPING, &c.

Charcoal and Steel Wire Ropes (Flat and Round), of best selected Charcoal and Steel Wire.

Guide Rods.

Galvanised Wire Signal Cord.

Galvanised and Plain Strand for Fencing.

Galvanised Wire Rope for Ships' Rigging.

Chains, Wire Rope Pulleys, Brattice Cloth, &c., &c.

Hemp Crab Ropes, of best selected Petersburg and Italian Hemp

Ditto Flat Ropes ditto ditto

Ditto Cordage ditto ditto

Manilla Rope, White and Tarred.

Flax Spun Yarn and Dressed Flax, for Packing.

Brown and White Spun Yarn.

Fine Dressed Petersburg and Italian Hemp, &c., &c.

Ships Rigging fitted to order. Estimates and special quotations supplied on application to

CRAVEN & SPEEDING BROS.

Wear Hemp and Wire Rope Works,
SUNDERLAND.



By a special method of preparation, this leather is made solid, perfectly close in texture, and impermeable to water; it has, therefore, all the qualifications essential for pump buckets, and is the most durable material of which they can be made. It may be had of all dealers in leather, and of—

I. AND T. HEPBURN AND SONS,

TANNERS AND CURRIERS, LEATHER MILLBAND AND HOSE PIPE MANUFACTURERS,

LONG LANE, SOUTHWARK, LONDON

Prize Medals, 1851, 1855, 1862, for

MILL BANDS, HOSE, AND LEATHER FOR MACHINERY PURPOSES.

Second Edition. Just published, price 8s. 6d.

A NEW GUIDE TO THE IRON TRADE
OR, MILL MANAGERS' AND STOCK-TAKERS' ASSISTANT;
Comprising a Series of New and Comprehensive Tables, practically arranged to show at one view the Weight of Iron required to produce Boiler-plates, Sheet-Iron, and Flat, Square, and Round Bars, as well as Hoop or Strip Iron of any dimensions. To which is added a variety of Tables for the convenience of Merchants, including a Russian Table.

By JAMES ROBE.

Batman's Hill Ironworks, Bradley, near Bliston.

OPINIONS OF THE PRESS.

"The Tables are plainly laid down, and the information desired can be instantly and accurately obtained."—*Mining Journal*.

"900 copies have been ordered in Wigan alone, and this is but a tithe of those to whom the book should commend itself."—*Wigan Examiner*.

"The work is replete on the subject of underground management."—*M. BAKER*, Colliery Proprietor.

To be had on application at the MINING JOURNAL Office, 26, Fleet-street, London

DEBILITY AND NERVOUSNESS.

Free Edition, 152 pages, post free, in envelope, two stamps. The WARNING VOICE.—A Special Medical Book for Young Men, on the Cause, Consequence, and Treatment of certain forms of Debility and Nervousness, viz.—Mental and Physical Depression, Palpitation of the Heart, Noises in the Head and Ears, Impaired Sight and Memory, Indigestion, Pains in the Back, Headache, Flies, Constipation, Hysteria, Dizziness, Local Weakness, Muscular Relaxation, Nervous Irritability, Bushing, &c., resulting from Exhaustion of Nerve Power, effects of Overwork, City Life, Worry, Brain Toll, Intemperance, and other abuses of the system.

Address, Dr. H. SMITH, 6, Burton Crescent, London, W.C.

THE MINING SHARE LIST.

BRITISH DIVIDEND MINES.

Shares.	Miner.	Paid.	Last wk.	Clos. pr.	Total divs.	Per sh.	Last pd.
1500	Alderley Edge, c, Cheshire*	10 0 0	—	—	12 11 8	0 0 0	8 Jan. 1876
4000	Brookwood, c, Buckfastleigh	1 16 0	—	—	3 16 0	0 0 0	2 Nov. 1876
2000	Bryn Allyn, c, Denbigh	10 0 0	—	—	0 7 0	0 0 0	7 Jan. 1877
400	Cashwell, c, Cumberland*	2 10 0	—	—	1 9 6	0 0 0	2 Aug. 1876
1000	Carn Brea, c, t, Illogan†	36 7 8	—	—	308 0 0	0 0 0	10 Feb. 1876
2150	Cook's Kitchen, c, Illogan†	24 4 9	—	—	117 0 0	0 0 0	7 Jan. 1877
1240	Devon Gt. Convol, c, Tavistock†	1 0 0	—	—	116 15 0	0 0 0	5 July 1877
4995	Dolcoath, c, t, Camborne	10 14 10	—	—	112 6 3	0 0 0	5 Mar. 1878
800	East Black Craig, c, t, Scotland*	8 0 0	—	—	0 10 0	0 0 0	10 Feb. 1877
800	East Darren, c, t, Cardiganshire	82 0 0	—	—	258 10 0	0 0 0	10 Aug. 1876
6100	East Pool, c, t, Illogan†	0 9 9	—	—	15 6 9	0 0 0	20 Feb. 1878
40 100	Glasgow Carr, c, t, 10,000 15s. p. j.	—	—	—	0 13 4	0 0 0	6 Feb. 1878
7500	Gorsead and Merilyn Cons., c, Flint 2 10 0	—	—	—	0 5 0	0 0 0	5 Oct. 1877
15000	Great Dyffryn, c, t, Montgomery	2 0 0	—	—	0 2 6	0 0 0	26 Apr. 1878
15000	Great Laxey, c, t, Isle of Man*	4 0 0	—	—	23 11 0	0 0 0	8 Apr. 1878
618	Gt. Retallack, c, t, Perranarabuth	4 0 0	—	—	1 6 0	0 0 0	16 May 1876
6400	Green Hurth, c, t, Durnham	18 6 0	—	—	1 18 0	0 0 0	3 Mar. 1878
30000	Groswinlon, c, t, Cardigan*	2 0 0	—	—	0 14 0	0 0 0	20 Jan. 1878
9830	Gunnislake (Clitters), c, t, e	6 5 0	—	—	0 13 9	0 0 0	1 Oct. 1876
60000	Holmbush, c, t, e, Callington*	1 0 0	—	—	0 4 6	0 0 0	6 Sept. 1877
2800	Isle of Man, c, t, Isle of Man†	26 0 0	—	—	32 0 0	0 0 0	10 Feb. 1876
19000	Leadhills, c, t, Lanarkshire	6 0 0	—	—	0 15 0	0 0 0	30 Mar. 1878
400	Leiburne, c, t, Cardiganshire	18 16 0	—	—	585 10 0	0 0 0	10 Feb. 1878
14000	Llanidloes, c, t, Montgomery	3 0 0	—	—	0 9 0	0 0 0	4 Nov. 1876
9000	Marke Valley, c, t, Linkinhorne	5 3 8	—	—	7 15 0	0 0 0	20 Jan. 1878
10000	Mellanaer Copper, Hayle*	2 0 0	—	—	0 2 0	0 0 0	20 Jan. 1878
9000	Minera Mining Co., c, t, Wrexham*	7 0 0	—	—	67 10 0	0 0 0	26 Feb. 1878
30000	Mining Co. of Ireland, c, t, e	7 0 0	—	—	23 17 0	0 0 0	26 Jan. 1878
444	North Bury, c, Chacewater	3 9 6	—	—	1 10 0	0 0 0	10 July 1877
10000	Panty Mwyn, c, t, Mold (8794 iss.)	2 0 0	—	—	0 2 6	0 0 0	10 Mar. 1878
5000	Pennant, c, t, St. Agnes	0 8 8	—	—	0 1 0	0 0 0	10 Feb. 1878
5000	Pennant, c, t, St. Agnes	3 2 6	—	—	3 13 6	0 0 0	9 June 1877
45793	Peatruhal, c, t, e, Gwent*	6 0 0	—	—	0 10 0	0 0 0	5 July 1877
18000	Prince Patrick, c, t, Holywell	2 0 0	—	—	0 28 0	0 0 0	8 Nov. 1876
10000	Red Rock, c, t, Cardigan	1 0 0	—	—	0 14 0	0 0 0	13 Jan. 1876
12000	Roman Gravel, c, t, Salop*	7 10 0	—	—	7 15 0	0 0 0	5 Mar. 1878
512	South Cardigan, c, t, Cleer	1 5 0	—	—	743 10 0	0 0 0	10 Mar. 1878
6123	South Condurrow, c, t, Camborne†	6 6 6	—	—	3 13 0	0 0 0	8 Apr. 1878
12000	St. Harton, c, t, Montgomery	3 0 0	—	—	0 6 0	0 0 0	8 July 1877
13000	So. Fr. Patrick, c, t, e, 18000 sh. issued	1 0 0	—	—	0 7 0	0 0 0	1 Oct. 1876
12000	Tantraville, c, t, Salop*	6 0 0	—	—	4 17 0	0 0 0	5 Dec. 1876
6000	Tinctor, c, t, Pool, Illogan†	9 0 0	—	—	50 8 0	0 0 0	5 May 1877
15000	Van, c, t, Llanidloes†	4 5 0	—	—	22 15 0	0 0 0	12 Oct. 1876
8000	W. Chiverton, c, t, Perranarabuth	12 10 0	—	—	55 10 0	0 0 0	10 Feb. 1878
478	West Faldio, c, t, Day	10 0 0	—	—	1 19 0	0 0 0	10 Feb. 1878
612	West Tolgus, c, t, Redruth	10 0 0	—	—	1 19 0	0 0 0	10 Feb. 1878
2048	West Wheel Farm, c, t, Illogan	95 10 0	—	—	3 12 6	0 0 0	5 Oct. 1876
600	West Wheel Farm, c, t, Illogan	28 1 3	—	—	26 15 0	0 0 0	10 Feb. 1878
12000	West Wye Valley, c, t, Montgomery	47 0 0	—	—	0 12 0	0 0 0	30 Nov. 1877
1024	Wh. Eliza Consols, c, t, St. Austell	3 0 0	—	—	446 0 0	0 0 0	15 Oct. 1876
2048	Wheel Jane, c, t, Kea	18 0 0	—	—	0 12 0	0 0 0	30 Nov. 1877
2048	Wheel Kitty, c, t, St. Agnes	23 13 0	—	—	17 0 0	0 0 0	10 Oct. 1876
25300	Wh. Newton, c, t, e, St. Austell*	1 0 0	—	—	5 0 0	0 0 0	5 July 1877
80	Wh. Newton, c, t, e, St. Austell*	1 0 0	—	—	11 18 0	0 0 0	26 Dec. 1876
3000	Wheel Power, c, t, Redruth	98 15 0	—	—	62 10 0	0 0 0	4 Sept. 1877
10000	Wye Valley, c, t, Montgomery*	7 11 0	—	—	0 6 0	0 0 0	5 Apr. 1878
10000	Wye Valley, c, t, Montgomery*	3 0 0	—	—	0 10 6	0 0 0	4 Oct. 1876

FOREIGN DIVIDEND MINES.

Shares.	Miner.	Paid.	Last wk.	Clos. pr.	Total divs.	Per sh.	Last pd.
35530	Alamillos, c, t, Spain†	2 0 0	—	—	1 19 8	0 0 0	10 April 1878
80000	Almada and Tinto Consol., c, t, Spain†	1 0 0	—	—	0 6 3	0 0 0	10 May 1878
80000	Australian, c, t, South Australia†	7 7 8	—	—	0 19 6	0 0 0	10 June 1877
10000	Battle Mountain, c, t, (6240 part pd.)	5 0 0	—	—	0 10 0	0 0 0	10 Nov. 1877
15000	Birdseye Creek, c, t, California*	4 0 0	—	—	0 14 0	0 0 0	2 June 1876
30000	Cape Copper Mining, c, t, So. Africa	7 0 0	—	—	30 10 0	0 0 0	17 Mar. 1878
34433	Cedar Creek, c, t, California*	1 0 0	—	—	0 6 0	0 0 0	2 June 1876
80000	Cesena Sul. Co., Romanga, Italy*	10 0 0	—	—	0 10 0	0 0 0	3 Aug. 1876
65000	Colorado, c, t, United States*	10 0 0	—	—	2 8 0	0 0 0	30 Nov. 1876
10000	Colorado, c, t, United States*	10 0 0	—	—	0 13 6	0 0 0	4 Jan. 1878
190000	Don Pedro North of the River†	0 16 0	—	—	7 11 5	0 0 0	30 May 1877
23500	Eberhardt & Aurora, c, t, Nevada†	10 0 0	—	—	2 8 0	0 0 0	20 Mar. 1878
70000	English and Australian, c, t, St. Austell	2 10 0	—	—	2 15 0	0 0 0	10 Dec. 1877
80000	Flanagan, c, t, Spain†	1 0 0	—	—	4 2 0	0 0 0	10 Mar. 1877
25000	Fortuna, c, t, Spain†	10 0 0	—	—	6 19 10	0 0 0	5 July 1877
50000	Frontino & Bolivia, c, t, New Granada†	2 0 0	—	—	0 1 0	0 0 0	10 April 1878
80000	Gold Run, c, t, Australia†	1 0 0	—	—	0 2 4	0 0 0	4 Oct. 1876
80000	Kapunda Mining Co., Australia†	1 0 0	—	—	0 2 4	0 0 0	6 June 1878
20000	Last Chance, c, t, Utah	5 0 0	—	—	0 14 0	0 0 0	20 July 1878
15000	Linares, c, t, Spain†	3 0 0	—	—	17 10 0	0 0 0	5 April 1878
65000	London and California, c, t, Spain†	3 0 0	—	—	0 1 0	0 0 0	10 April 1878
7837	Lusitania, Portugal† (25 sh.)	8 10 0	—	—	11 16 0	0 0 0	16 Mar. 1878
5000	Mamm. Corp.,ropolis of Utah, c, t, Utah	10 0 0	—	—	0 5 0	0 0 0	5 Dec. 1876
5000	Mountain Chief, c, t, Utah†	10 0 0	—	—	0 5 0	0 0 0	5 Dec. 1876
10000	Pontgibaud, c, t, France†	20 0 0	—	—	25 8 0	0 0 0	4 Jan. 1878
130000	Port Phillip, c, t, Clunes†	1 0 0	—	—	10 0 0	0 0 0	11 Nov. 1877
54000	Richmond Consols, c, t, Nevada†	5 0 0	—	—	4 4 0	0 0 0	7 Feb. 1878
40000	Santa Barbara, c, t, Brazil†	0 10 0	—	—	0 8 0	0 0 0	7 Feb. 1878
120000	Scottish Australian Mining Co., New	1 0 0	—	—	15 per cent.	Nov. 1877	
80000	Sierra Nevada, c, t, California†	2 0 0	—	—	15 per cent.	Nov. 1877	
60000	South Aurora, c, t, Nevada†	2 0 0	—	—	0 14 2	0 0 0	2 Oct. 1877
2253000	St. John del Rey† (25 stock & multiples dealt in)	5 0 0	—	—	15 per cent.	Nov. 1877	
20000	Tollima, c, t, So. America	5 0 0	—	—	15 per cent.	Nov. 1877	
25000	Victoria (London), c, t, Australia†	1 0 0	—	—	11 6 0	0 0 0	6 May 1878
15000	Western Andes, c, t, New Granada	5 0 0	—	—	0 12 0	0 0 0	12 July 1876
91000	W. Prussian (5500 pref. sh. 10l. pd)	10 0 0	—	—	1 8 0	0 0 0	4 Jan. 1878

NON-DIVIDEND FOREIGN MINES.

Shares.	Miner.	Paid.	Last wk.	Clos. pr.	Total divs.	Per sh.	Last pd.
12000	Anguilla Phosphate, West Indies (4000 issued)	10 0 0	—	—	—	—	—
30000	Argentine, c, t, Argentine Republic	10 0 0	—	—	—	—	—
30000	Blue Tint, c, t, Peru† (210 shares)	10 0 0	—	—	—	—	—
49935	Chontales, c, t, Nicaragua†	5 0 0	—	—	—	—	—
16000	Condes of Chilli, c, t, Chile†	2 0 0	—	—	—	—	—
30000	English Australian, c, t, Victoria*	1 0 0	—	—	—	—	—
80000	Excelsior Hydraulic Gold Washing Co., California*	1 0 0	—	—	—	—	—
100000	Exchequer, c, t, California†	1 0 0	—	—	—	—	—
40000	Holcombe Valley, c, t, California†	1 0 0	—	—	—	—	—
8000	Hornachos, c, t, Spain†	1 0 0	—	—	—	—	—
12000	Hultafall, c, t, Orebro, Sweden	1 0 0	—	—	—	—	—
12000	Hunter Consolidated, c, t, Utah	5 0 0	—	—	—	—	—
112500	Imperial Brazilian Collieries, Brazil†	10 0 0	—	—	—	—	—
100000	I. L. S., c, t, California†	1 0 0	—	—	—	—	—
50000	Javali, c, t, Nicaragua†	1 0 0	—	—	—	—	—
5600	La Mancha, c, t, Newfoundland	10 0 0	—	—	—	—	—
12000	Lancaster, c, t, e, Viscaya, Spain† (25 shares)	1 15 0	—	—	—	—	—
75000	Malabar, c, t, Colombia† (67185 issued)	1 0 0	—	—	—	—	—
40000	Malaga, c, t, Colombia† (7400 pref. shares, fully paid)	1 0 0	—	—	—	—	—
12000	Menzenberg, c, t, Honnet, Germany*	1 0 0	—	—	—	—	—
4588	New Bensenberg, c, t, Germany*	5 0 0	—	—	—	—	—
30000	New Quebrada, c, t, Venezuela†	5 0 0	—	—	—	—	—
8000	New Zealand Kapanga, c, t, Oromand†	5 0 0	—	—	—	—	—
50000	Panulillo, c, t, Oregon, U.S. (preference shares)	5 0 0	—	—	—	—	—
80000	Pastorena United, c, t, Italy† (480000 debentures)	4 0 0	—	—	—	—	—
50000	Providencia and New Rosario, c, t, Mexico*	3 0 0	—	—	—	—	—
60000	Rica, c, t, Colombia† (40000 issued)	1 0 0	—	—	—	—	—
2,181,000	Rio Tinto, c, t, Huelva, Spain	1 0 0	—	—	—	—	—
100000	Rosa Grande, c, t, Brazil† (21 shares)	0 19 0	—	—	—	—	—
30000	Russia Copper, Orenburg and Ufa†	10 0 0	—	—	—	—	—
50000	San Pedro, c, t, Chile†	10 0 0	—	—	—	—	—
10000	Silver Plume, c, t, Colorado*	2 0 0	—	—	—	—	—
80000	Tecoma, c, t, Utah†	1 0 0	—	—	—	—	—
43174	United Mexican, c, t, Mexico†	28 15 3	—	—	—	—	—
10000	Utah, c, t, Utah†	1 0 0	—	—	—	—	—
28000	Vierberg, c, t, Rheinbreitbach, Germany† (22 shares)	1 15 0	—	—	—	—	—
15000	Yorke Peninsula, c, t, South Australia	1 0 0	—	—	—	—	—
40000	Yorke Peninsula, c, t, South Australia	1 0 0	—	—	—	—	—

† Have made calls since last dividend was paid.

NON-DIVIDEND MINES.

Shares.	Miner.	Paid.	Last wk.	Clos. pr.
40000	Aberdunant, c, t, Llanidloes*	1 0 0.	1 ..	¾ 1
10000	Aberystwyth, c, t, Cardigan*	5 0 0.	—	—
80	Albion, c, t, Cornwall	100 0 0.	—	—
7500	Alvir & Burng, c, t, St. Austell	3 0 0.	1¾..	1½ 1¾
12000	Assheton, c, t, Carnarvonshire*	5 0 0.	1 ..	1 1½
5000	Ballycunnisk, c, t, Schull	2 0 0.	—	—
12000	Bedford Unit, c, t, e, Taviat, (12 liab.)	2 0 0.	—	—
24000	Belstone, c, t, e, Devon (27,000 fy. pd.)	1 0 0.	¾..	¾ ¾
800	Blaen Caelan, c, t, Cardigan	3 0 0.	—	—
2927	Bine Hills, c, t, St. Agnes	3 0 0.	5 ..	4¾ 5
30000	Bodladr, c, t, b, Denbighshire	3 12 6.	1 ..	¾ 1
2000	Bollihope Vale, c, s, Durham	1 0 0.	1¾..	1¾ 1¾
200	Botallack, c, t, St. Just†	5 0 0.	—	—
5000	Brownen Hill, c, t, mn	123 15 0.	—	—
6000	Cadnam, c, t, St. Austell	1 0 0.	—	—
50000	Cambrian, c, s, c, Cardiganshire.....	1 0 0.	1 ..	¾ 1..
3548	Cargil, c, s, c, Cardiganshire.....	2 0 0.	3¾..	3 ¾
10000	Caron, c, t, Cardigan.....	7 4 0.	—	2 ¾
80000	Central Foxdale, c, t, l, of Man* (24 sh.)	2 0 0.	2¾..	2¾ 2¾
10000	Central Van, c, t, c, Llanidloes	1 5 0.	—	2¾
1500	Clementina, c, t, Llanrwst	5 0 0.	—	—
5000	Combellack, c, t, Wendron	1 0 0.	1¾..	1 1½
400	Combarnet, c, s, North Devon	2 0 0.	—	—
400	Conter Grange, c, s, Cardiganshire.....	0 7 0.	¾..	¾ ¾
5000	Cwnt Dwyfor, c, s, c, Carnarvonsh.	1 0 0.	1¾..	1 1½
5000	Cwynystwith (New) [61. shares]	1 0 0.	—	—
1280	D'Eresby Cons., c, l, b, Carnarvon	4 0 0.	—	—
512	D'Eresby Mountain, c, b, b, Llanrwst.	10 0 0.	14 ..	12 14
10000	Denbighshire Consolidated, c, s*	20 0 0.	100 ..	83 100
5000	Dewrent, c, t, Durham	3 0 0.	1 ..	¾ 1
1000	Dubby Syke, c, t, Durham*	4 0 0.	1¾..	1¾ 1¾
144	East Caradon, c, t, Cleer†	0 15 0.	—	¾ ¾
100	East Chiverton, c, t, Perranrhalog	2 10 0.	¾..	¾ 1
100	East Craven Moor, c, t, Pateley Bdg.	7 19 0.	3 ..	2¾ 3
0	East Gwynnig, c, t, Cardigan	2 0 0.	10 ..	9 10
22	East Wn, c, t, Llanidloes	2 0 0.	—	—
500	Elgar, c, s, t, Cardiganshire	9 1 0.	¾..	¾ ¾
100	Fronvellan, c, t, Mont.* [4000 sh. fy. pd.]	1 0 0.	¾..	¾ ¾
50	Gawton, c, t, Taviatock	4 5 0.	—	—
100	Glan Cloy, c, t, Gwyddelwern	1 5 0.	¾..	¾ ¾
100	Glenroy, c, s, t, Isle of Man	1 0 0.	—	—
100	Glyn, c, t, Llanidloes	4 5 0.	¾..	¾ ¾
100	Gwynnig, c, t, Llanidloes	2 10 0.	¾..	¾ ¾
0	Gold, c, t, Merionethshire	2 10 0.	—	—
0	Goreu, c, t, Carmarthen	1 0 0.	—	—
0	Gt. E. Foxdale, c, l, l, of Man (12 sh)	0 18 0.	1 ..	¾ 1
0	Great Hallway, c, t, Flintshire	5 0 0.	—	—
0	Great Pant-y-Pwll, c, t, Holywell	2 0 0.	5¾..	5 5¾
0	Gt. Wheal Fawcett, c, t, North Bovey.	1 15 0.	2 ..	1¾ 2
100	Harehope Gill, c, t, Durham (21 sh.)	0 5 0.	—	—
100	Hartington Moor, c, t, Durham (21 sh.)	0 5 0.	—	—
100	Harwood, c, s, carb, c, t, Derby	1 0 0.	2 ..	1½ 2
100	Herodfoot, c, t, Durham	0 15 0.	58 ..	45. 58.
100	Hingston Down, c, t, Flintshire	8 10 0.	¾..	7 8
100	Hush Elstiedford Miners, c, t, Caistock†	0 5 0.	—	—
100	Islay, c, t, Scotland	2 0 0.	¾..	¾ ¾
100	Killaloe, c, t, Tipperary†	28 0 0.	—	—
100	Kilfrith, c, t, Chacewater	2 1 0.	—	—
100	Kington Con, c, s, Stoke Climsland.	1 0 0.	¾..	¾ ¾
100	Llido, c, t, preference	1 0 0.	—	—
100	Ladywell, c, t, Salop.....	1 0 0.	1¾..	1 1½
100	Llido, 10 per cent. pref., c, t, each.....	2 10 0.	1¾..	¾ 1¾
100	Leint, c, t, St. Just.....	0 10 0.	¾..	¾ ¾
100	Livingstone Consols, c, t, St. Agnes	9 18 6.	—	20 8
100	Llanidloes, c, t, Wendron	0 10 0.	1 ..	¾ 1
100	Llanrhadr, c, t, Llanidloes	0 10 0.	2 ..	1½ 2
100	Llanrwst, c, t, Montgomery*	2 0 0.	—	—
100	Llanrwst, c, t, Carnarvon	2 0 0.	4 ..	3 4
100	Llanrwst, c, t, Llanidloes	50 0 0.	60 ..	55 60
100	Llanrwst, c, t, Llanidloes	1 17 4.	—	—
100	Llanrwst, c, t, Llanidloes	3 0 0.	1¾..	¾ 1¾
100	Llanrwst, c, t, Llanidloes	5 0 0.	—	—
100	Llanrwst, c, t, Llanidloes	1 0 0.	¾..	¾ ¾
100	Llanrwst, c, t, Llanidloes	1 0 0.	¾..	¾ ¾
100	Llanrwst, c, t, Llanidloes	1 0 0.	¾..	¾ ¾
100	Llanrwst, c, t, Llanidloes	1 0 0.	¾..	¾ ¾
100	Llanrwst, c, t, Llanidloes	1 0 0.	¾..	¾ ¾
100	Llanrwst, c, t, Llanidloes	1 0 0.	¾..	¾ ¾
100	Llanrwst, c, t, Llanidloes	1 0 0.	¾..	¾ ¾
100	Llanrwst, c, t, Llanidloes	1 0 0.	¾..	¾ ¾
100	Llanrwst, c, t, Llanidloes	1 0 0.	¾..	¾ ¾
100	Llanrwst, c, t, Llanidloes	1 0 0.	¾..	¾ ¾
100	Llanrwst, c, t, Llanidloes	1 0 0.	¾..	¾ ¾
100	Llanrwst, c, t, Llanidloes	1 0 0.	¾..	¾ ¾
100	Llanrwst, c, t, Llanidloes	1 0 0.	¾..	¾ ¾
100	Llanrwst, c, t, Llanidloes	1 0 0.	¾..	¾ ¾
100	Llanrwst, c, t, Llanidloes	1 0 0.	¾..	¾ ¾
100	Llanrwst, c, t, Llanidloes	1 0 0.	¾..	¾ ¾
100	Llanrwst, c, t, Llanidloes	1 0 0.	¾..	¾ ¾
100	Llanrwst, c, t, Llanidloes	1 0 0.	¾..	¾ ¾
100	Llanrwst, c, t, Llanidloes	1 0 0.	¾..	¾ ¾
100	Llanrwst, c, t, Llanidloes	1 0 0.	¾..	¾ ¾
100	Llanrwst, c, t, Llanidloes	1 0 0.	¾..	¾ ¾
100	Llanrwst, c, t, Llanidloes	1 0 0.	¾..	¾ ¾
100	Llanrwst, c, t, Llanidloes	1 0 0.	¾..	¾ ¾
100	Llanrwst, c, t, Llanidloes	1 0 0.	¾..	¾ ¾
100	Llanrwst, c, t, Llanidloes	1 0 0.	¾..	¾ ¾
100	Llanrwst, c, t, Llanidloes	1 0 0.	¾..	¾ ¾
100	Llanrwst, c, t, Llanidloes	1 0 0.	¾..	¾ ¾
100	Llanrwst, c, t, Llanidloes	1 0 0.	¾..	¾ ¾
100	Llanrwst, c, t, Llanidloes	1 0 0.	¾..	¾ ¾
100	Llanrwst, c, t, Llanidloes	1 0 0.	¾..	¾ ¾
100	Llanrwst, c, t, Llanidloes	1 0 0.	¾..	¾ ¾
100	Llanrwst, c, t, Llanidloes	1 0 0.	¾..	¾ ¾
100	Llanrwst, c, t, Llanidloes	1 0 0.	¾..	¾ ¾
100	Llanrwst, c, t, Llanidloes	1 0 0.	¾..	¾ ¾
100	Llanrwst, c, t, Llanidloes	1 0 0.	¾..	¾ ¾
100	Llanrwst, c, t, Llanidloes	1 0 0.	¾..	¾ ¾
100	Llanrwst, c, t, Llanidloes	1 0 0.	¾..	¾ ¾
100	Llanrwst, c, t, Llanidloes	1 0 0.	¾..	¾ ¾
100	Llanrwst, c, t, Llanidloes	1 0 0.	¾..	¾ ¾
100	Llanrwst, c, t, Llanidloes	1 0 0.	¾..	¾ ¾
100	Llanrwst, c, t, Llanidloes	1 0 0.	¾..	¾ ¾
100	Llanrwst, c, t, Llanidloes	1 0 0.	¾..	¾ ¾
100	Llanrwst, c, t, Llanidloes	1 0 0.	¾..	¾ ¾
100	Llanrwst, c, t, Llanidloes	1 0 0.	¾..	¾ ¾
100	Llanrwst, c, t, Llanidloes	1 0 0.	¾..	¾ ¾
100	Llanrwst, c, t, Llanidloes	1 0 0.	¾..	¾ ¾
100	Llanrwst, c, t, Llanidloes	1 0 0.	¾..	¾ ¾
100	Llanrwst, c, t, Llanidloes	1 0 0.	¾..	¾ ¾
100	Llanrwst, c, t, Llanidloes	1 0 0.	¾..	¾ ¾
100	Llanrwst, c, t, Llanidloes	1 0 0.	¾..	¾ ¾
100	Llanrwst, c, t, Llanidloes	1 0 0.	¾..	¾ ¾
100	Llanrwst, c, t, Llanidloes	1 0 0.	¾..	¾ ¾
100	Llanrwst, c, t, Llanidloes	1 0 0.	¾..	¾ ¾
100	Llanrwst, c, t, Llanidloes	1 0 0.	¾..	¾ ¾
100	Llanrwst, c, t, Llanidloes	1 0 0.	¾..	¾ ¾
100	Llanrwst, c, t, Llanidloes	1 0 0.	¾..	¾ ¾
100	Llanrwst, c, t, Llanidloes	1 0 0.	¾..	¾ ¾
100	Llanrwst, c, t, Llanidloes	1 0 0.	¾..	¾ ¾
100	Llanrwst, c, t, Llanidloes	1 0 0.	¾..	¾ ¾
100	Llanrwst, c, t			